

western industry



Completely integrated assembly lines increase efficiency at Hewlett-Packard. See page 27.



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OF CRANES AND HOISTS**

special: **PRODUCTION EFFICIENCY
LITERATURE ON WELDING**

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Melting furnace at Calumet & Hecla, Inc.—Wolverine Division, where Shell Irus Fluid 902 eliminates the danger of hydraulic line fires.

Ready...aim... NO FIRE!

Take 10 high-temperature alloy-melting furnaces, hydraulically operated—each pouring 1500 lbs. of molten metal every hour in close proximity to “live” hydraulic lines—and you can readily see why selection of hydraulic fluids is important to Calumet & Hecla's Wolverine Tube Division.

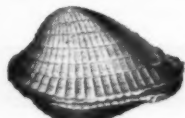
Now the operation is made more reliable by the use of Shell Irus Fluid 902, a water-in-oil emulsion type fluid. Irus® Fluid was C & H's choice, after carefully

studying other commercial hydraulic fluids—for many reasons:

1. Irus Fluid will not support combustion.
2. Irus Fluid has excellent lubricating properties.
3. Irus Fluid has hydraulic efficiency and equipment compatibility.
4. Irus Fluid is economical, costing about one-third less than other fire-resistant fluids.
5. Irus Fluid's bright yellow color makes it easy to spot and trace leaks.

In plant after plant, operators find that these advantages assure maximum safety to both personnel and equipment.

If you have a hydraulic line fire hazard, we suggest that you have the Shell Industrial Products Representative show you the many advantages in Irus Fluid 902; or write to Shell Oil Company, 50 W. 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Calif. In Canada: Shell Oil Company of Canada, Ltd., 505 University Ave., Toronto 2, Ontario.



AN INTERESTING FACT!

Every Shell Branded Industrial Lubricant is named for a sea shell. Shown here is the *Irus* ellipticus.

SHELL IRUS FLUID 902
the low-cost, fire-resistant hydraulic fluid



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SERVES THE THIRTEEN WESTERN STATES

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COVER PHOTO

ASSEMBLY LINES at Hewlett-Packard plant #2, part of new manufacturing complex recently completed by firm at Stanford Industrial Park, Palo Alto, Calif. Note roller conveyors, lazy susans and cradles. For story, see *Production Efficiency Report*, page 27.

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dishwashers



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FROM PORTLAND ASK OPERATOR FOR COMMERCE 9785 (TOLL FREE)

Mobil Program produces \$20,099

K&T's automated Milwaukee-Matic is a specialized, high-precision tape-controlled multi-purpose machine tool. Mobil-recommended procedures for preventing fouling of vital hydraulic servo-valves during initial start-up have greatly simplified field preventive maintenance flushing operations. Savings to date: \$11,515.



Dollar Savings for Kearney & Trecker

Reduces oil costs . . . promotes effective PM procedures . . . produces production economies in building of K&T special tape-controlled machinery

Kearney & Trecker is a major producer of numerically controlled precision machines, including skin mills, profilers—and the exciting new Milwaukee-Matic, a tape-controlled machine tool which can automatically perform a wide variety of complex machining operations on a given workpiece with a single setup.

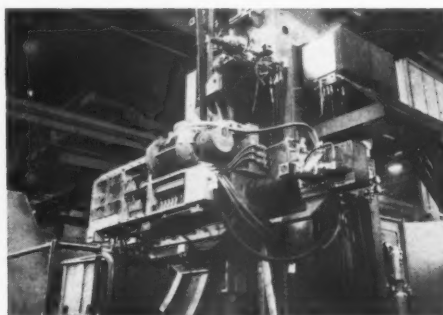
Long a subscriber to the Mobil approach to Correct Lubrication, K&T has relied on a Mobil Program through the 7 years of operation of its Special Machinery Division plant. Close cooper-

ation and liaison between Mobil and K&T personnel have resulted in a minimum of downtime, rock-bottom lubrication costs, and improved maintenance, manufacturing and production efficiencies. Dollar savings at K&T to date total \$20,099 . . . just one indication of the success of the Mobil Program.

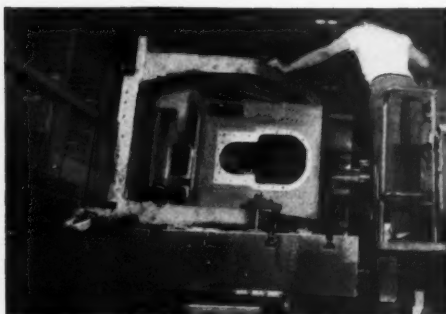
For information on how a Mobil Program might benefit you, call your Mobil Representative or write: Mobil Oil Company, 150 East 42nd Street, New York 17, New York.



To assure clean hydraulic systems and correct operation of servo-valves, K&T uses large quantities of hydraulic oil to test-operate its special machinery prior to shipment. Previous practice had been to discard all oils after a single use. At Mobil's recommendation, these oils are now filtered and re-used for preliminary flushing operations. Savings to K&T: \$4,631 in 1959.



In manufacturing Profilers, K&T planned to remove loose mill scale from hydraulic piping by dismantling parts and pickling them. At Mobil's recommendation, piping was left intact, and each unit was flushed with a specially formulated hydraulic oil. This dissolved binder material permitting effective removal of dirt and scale—with resultant savings of \$3,953.



A Mobil-recommended preventive maintenance procedure for correct lubrication on this \$300,000 horizontal boring mill prevented a recurrence of a \$2,550 repair bill previously caused by lack of lubrication.



When the mist lubricating unit in K&T's Milwaukee-Matic produced a dense migrating oil fog, Mobil was asked for a solution. Next morning K&T had it. A special Mobil oil in the micro-fog unit eliminated objectionable fog.

Oil Correct Lubrication

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Large Pitch Chain

is "ENDURANCE TESTED" for

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Here's a chain capable of withstanding the severest of abuse and punishing shock loads. Their glass-hard wearing surfaces and rugged heat treated links give you dependable performance under conditions far too grueling for ordinary chains.



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If you have a heavy-duty installation there's an Acme roller chain built with the characteristics necessary to do the job effectively and more economically.

Call your Local Industrial Distributor or our Engineering Department for fast service on your chaining problems.



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AGAIN-



Revere helps "fit the metal to the job"

AND A COMMUTATOR MANUFACTURER SAVES ON BOTH MATERIAL COSTS AND OVERALL COSTS WHILE PRODUCING A SUPERIOR PRODUCT

The hub of the small commutator you see above originally was made of a ferrous metal. Certain problems cropped up due to the fact that the rod from which the hubs were fabricated, not only had to be drilled, but it also had to be able to withstand a flanging operation. The engineering department of Dayton Precision Manufacturing Company called in one of Revere's Technical Advisors for consultation.

After a thorough study of the problem Revere Brass Rod of a certain alloy was recommended and samples were furnished. The machinability of the rod was found to be outstanding, being readily and speedily drilled. Also it withstood the flanging operation . . . a set of manufacturing conditions where only brass, the right kind of brass, outshines all other metals and alloys.

Final score: The low first cost of the brass rod, plus its

superior machinability, resulted in a more satisfactory product without the penalty of higher costs. A further advantage to the manufacturer was the added sales appeal of the brass hub.

And there you have another example of how Revere in collaboration with the manufacturer helped, "fit the metal to the job," which resulted in a better part at the least possible cost. Why don't you take advantage of this kind of service?



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HUB CITY

UNIVERSAL GEAR BOXES



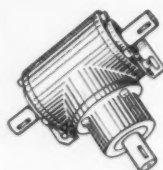
MODEL 88
STANDARD
DUTY

Capacity up to 65 H.P. in gear ratios of 1:1, 1½:1, 2:1 and 3:1. Four ½" N.C. tapped holes, top and bottom for easier mounting and reversal of rotation. Timken bearings, spring loaded grease seals. 1½" shafts with ⅝" K.W., smaller sizes available. Box width 9⅝", height 8⅝", length 11⅝". Shafts extend 3". Sh. Wt. 90 lbs. Net Wt. 75 lbs.



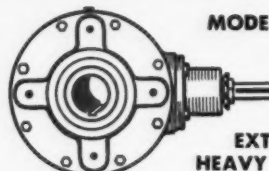
MODEL 66
UTILITY DUTY

Capacity up to 40 H.P. in gear ratios of 1:1, 1½:1, 2:1. Four ¾" N.C. tapped mounting holes, top and bottom for convenience and reversal of rotation if desired. Timken bearings and spring loaded grease seals. 1½" shafts, ¼" Keyways. Box width 7¼", height 5⅞", length 8⅝". Shafts extend 2½". Can be modified if desired. Sh. Wt. 50 lbs. Net Wt. 42 lbs.



NEW
MODEL 11
LIGHT
DUTY

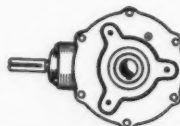
Compact, lightweight gear box particularly suitable for auger drives, agitator drives, multiple conveyor drives in series and similar applications. Capacity up to 10 H.P. Choice of 1:1 or 1.8:1 ratios. Cast iron gear case. Equipped with Timken tapered roller bearings throughout. Spring loaded grease seals. 1" Round Steel Ground Shafts with ¼" x ⅞" Woodruff type keyways. Overall length 6½", excluding pinion extension. Overall height—4⅞". Detachable mounting brackets may be moved to any bolt locations on input or output shaft housings. Shaft sizes and extensions can be modified to suit specific application. Shipping Weight—19 lbs. Net Weight—17 lbs.



MODEL 99
EXTRA
HEAVY DUTY

Specially designed for rock pickers, transit mixers, ditchers and other industrial uses. Capacity up to 115 H.P. Choice of 40 to 6, 37 to 9, 34 to 7 or 53 to 8 ratios. Mounting holes tapped both sides for universal use. Heavy cast iron, totally enclosed gear case. Ring gear carrier and pinion mounted on Timken bearings. Spring loaded grease seals. Input shaft 1½". Round with ¼" K.W. Output tube bore 2⅞" with ¾" K.W.—can be furnished in smaller bore. Overall case length 16". Case diam. 12". Width thru output bore 8⅞". Four ½" N.C. tapped mounting holes on 9¼" circle—both sides of case. Sh. Wt. 135 lbs.—Net Wt. 130 lbs.

MODEL 77
HEAVY DUTY



Similar to Model 99 but for capacities up to 85 H.P. Used on root crop harvesters, auger drives, feed mixers, etc. Equipped with 3.77 to 1 automotive type ring gear and pinion. Angle gear drive with high torque output with moderate speed reduction. Totally enclosed cast iron gear box. Timken tapered roller bearing equipped. Spring loaded grease seals. Output bore, 1½" round—¾" Keyway. Pinion shaft, 1½" round—⅝" Keyway. Both can be modified as required. Outside diameter, 10¾"; width, 6⅞". Pinion housing extends 2½", shaft and housing extends 6". Three ½" N.C. tapped mounting holes on 6⅞" circle. Shipping weight, 85 lbs.—net weight, 80 lbs.

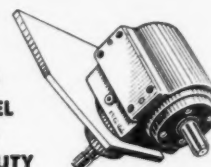
W33 SERIES

Worm Gear
Speed Reduction Unit

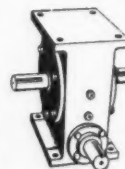


Available in 10:1, 20:1 and 40:1 gear ratios. Aluminum case, Timken Bearings, grease seals both ends of shafts. Input shaft ¾" round with ⅝" K.W. Output shaft 1" hole, ½" K.W., 5½" wide, 6⅞" high, 4⅞" thick thru hub, 2⅞" thru case. Shipping weight 10 lbs.—Net weight 8½ lbs.

NEW
MODEL
PT 2900
and MODEL
PT 2950
SPECIAL DUTY



Heavy Duty Angle Drive Gear Box designed to drive Rotary Tillers and Rotary Mowers. Available with special mounting brackets to best suit manufacturers specifications. Timken tapered roller bearings used thruout. Spring loaded grease seals on all shaft openings. Rugged, compact cast iron case assures trouble-free service in minimum space. 21 to 32 tooth gearing ratio only, but can be set up for either reduction or increase. Easily serviced without special equipment. For special mounting problems, submit drawings and specifications for prompt quotations.



NEW
MODEL W55
WORM GEAR
SPEED
REDUCER

Designed for use where large speed reductions are required. High torque, low R.P.M. is developed from high R.P.M. electric motors or other power sources, it is particularly suited to such varied applications as augers, conveyors, barn cleaners, elevators, mixers, etc. Can be mounted in any desired position, with output shaft horizontal or vertical with worm either above or below gear. Two mounting pads provide universal mounting—also facilitate mounting power source directly on reducer. Capacity up to 5 H.P. Available in 3 ratios: 15 to 1, 30 to 1 and 60 to 1. Input shaft 1½" round with ¼" K.W. Output shaft 1¾" round with ⅝" K.W. 11¼" high, 10⅞" long, 7⅞" deep. Timken tapered roller bearings on all shafts. Spring loaded grease seals. Steel worm and hardened bronze alloy worm gear for added strength. Shipping weight 85 lbs. Net Wt. 80 lbs.

Dimensional drawings of above gear drives are available on request. For prompt quotations on your particular gear drive requirements submit blueprints and specifications—We can manufacture and make speedy delivery at competitive prices.



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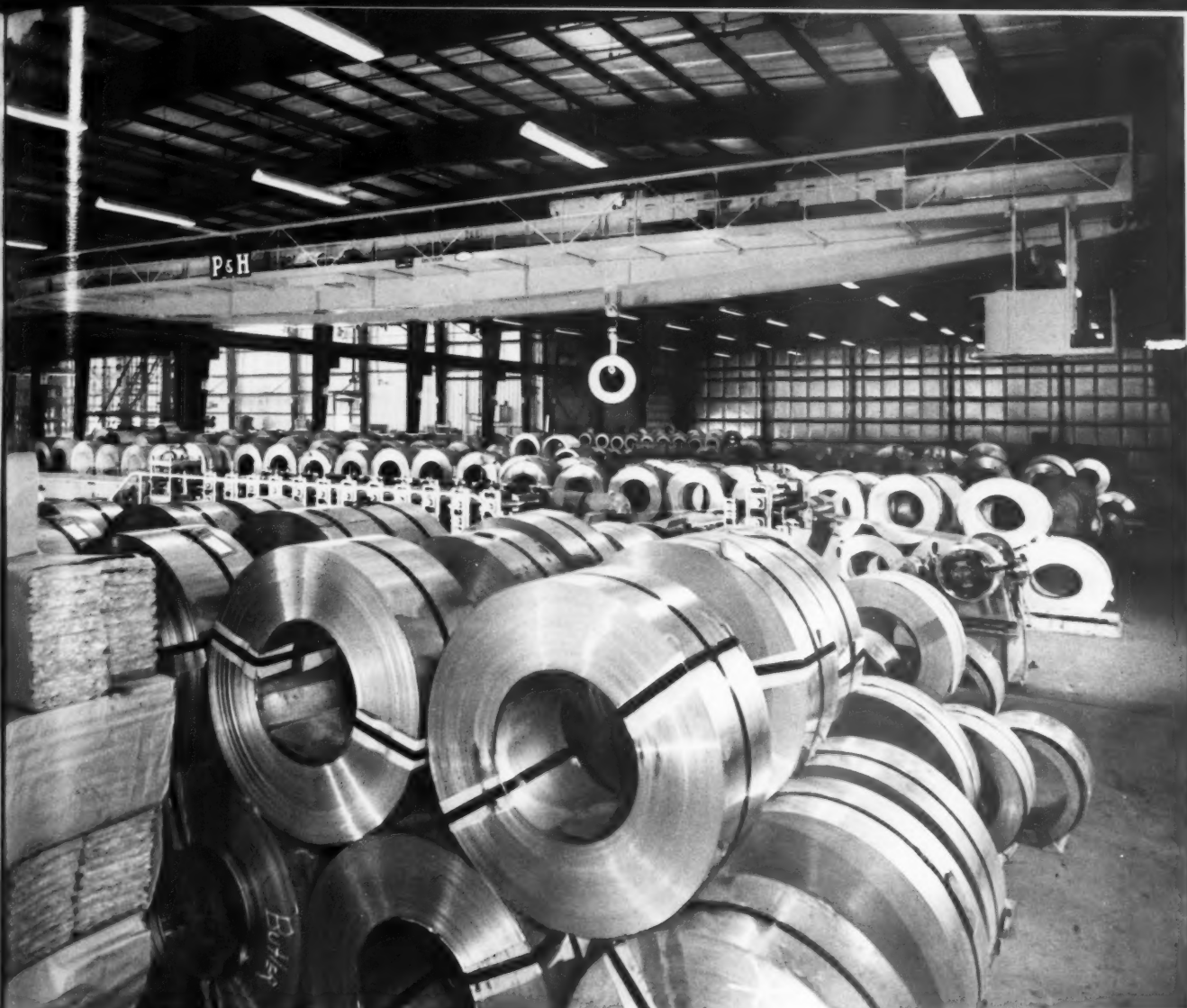


Photo courtesy Butler Mfg. Co., Galesburg, Illinois

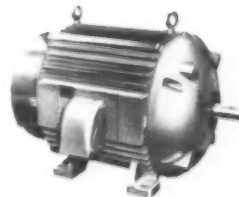
FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

IN METAL FABRICATION... One man in the cab of this P&H overhead crane keeps several slitting and roll-forming machines supplied with coils of metal for continuous production. In addition, he spots incoming coils in proper storage areas as they arrive from the mills.

This manufacturer of standardized commercial buildings gets full use of plant floor area by moving materials through the air. The P&H crane and special coil-handling hook eliminates the "dead" aisle space needed with floor-operated equipment. It also saves manpower, and the safe, precision handling reduces damage to finished stock.

As with every Harnischfeger installation, this long-span (87') crane is specially engineered to consider all factors that may affect operation on this particular job. Special problems are taken in stride, integrated into the overall design. Only this kind of integrated engineering can give you performance that's never in doubt, performance P&H crane users have relied on for over 76 years! Why not find out more about P&H "job-engineered" cranes? Write for bulletin C-42, Department 124, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

All P&H motors are built specifically for crane service—not adapted to it! P&H engineers have designed extra ruggedness into every part for maximum efficiency under the most severe conditions of fast acceleration, frequent reversals, and repeated shock loads. Thousands of P&H crane motors in every-day use prove that they give years of trouble-free service with minimum maintenance.



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You may not handle missile components, but isn't fast, safe, dependable, precision lifting and spotting just as important to uninterrupted production in your plant? If so, it will pay you to find out more about the P&H Zip-Lift's quality design features — dual brakes, 24-volt controls, shaved gears running in oil, permanently lubricated bearings, just to name a few.

Best of all, the price is down low enough to make a purchasing agent smile! Write for bulletin H-20, Department 226, Harnischfeger Corporation, Milwaukee 46, Wisconsin.



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Airco supplies electrodes or wire for all three, can give unbiased advice, broad selection. Are the stainless steels that you weld light gauge or heavy... martensitic, ferritic or austenitic... subject to heat, corrosion or stress? Whatever the application, Airco supplies electrodes or wire to weld them *better*.

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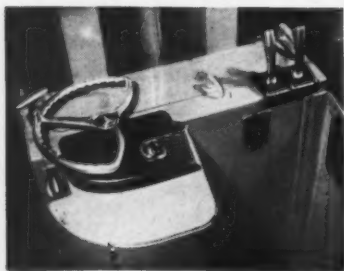
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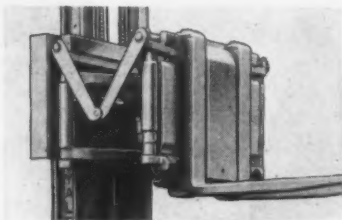
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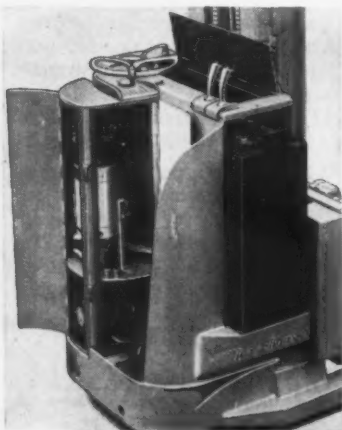
save space you can't afford to waste **YALE WAREHOUSERS**



Control grouping saves time by permitting operator to lift or lower while travelling. Direction indicator in steering wheel hub shows drive wheel direction, saves effort in cramped quarters, prevents stalling. Hour meter checks operating time, ton-hour handling costs, permits maintenance based on running time.



An exclusive separate motor and hydraulic system in the Extend-A-Load for fork extension and tilt increases efficiency . . . saving power. Unitized design gives maximum maintenance accessibility. Exclusive, interlocking I-beam mast gives greater strength and stability. Mast and carriage ride on large ball-bearing rollers.



Operational maintenance is easier. Maximum accessibility to components without sacrifice of chassis strength and rigidity. Immediate access to battery for inspection. Easy battery removal.

• Get more pallet rows in the same space • Can work in a 6 ft. aisle • Stack to 20 feet and more • Save on low maintenance • Reduce power costs • 2000, 3000, 4000 lb. capacity.

You get greater power in less space with the 24-volt Yale Warehouser. More efficient use of power for increased work capacity. Faster lift and sustained high-speed travel.

The Yale Extend-A-Load model handles various widths of loads because different size pallets and skid bins can be handled without nesting between outriggers. Maintenance is easier and power is conserved by Yale's exclusive separate power unit for fork extension. Extend-retract device designed for low overall height to prevent robbing you of valuable space in high stacking. Forks can be tilted back to 6 degrees to protect load and speed operations. They can be extended, retracted or tilted at any height of lift. Twin tilt cylinders eliminate sway of forks—provide load stability.

Start saving now. Yale has a finance plan that will put this truck to work for you immediately. For more information, contact your Yale Representative, or write to: The Yale & Towne Manufacturing Company, Materials Handling Division, Philadelphia 15, Pa. Dept. R-005A.

Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., Forrest City, Ark. Products: Gasoline, Electric, Diesel, and LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air, and Electric Hoists

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Save space where space costs most—cold storage operations. How much does your space cost?

western industry

western meetings

1960 ASTME Western Engineering Conference & Exhibit, Nov. 14-18

ONE OF THE WEST'S most important conferences and trade shows will be held in Los Angeles this month on November 14 to 18 at the Los Angeles Memorial Sports Arena and the Ambassador Hotel. The American Society



THIS SHOT of a previous Tool Show is typical of the exhibits that visitors can expect to see on November 14-18 at the ASTME Western Engineering Exhibit, held in the Los Angeles Memorial Sports Arena.

of Tool and Manufacturing Engineers are having their Western Engineering Conference and Exhibit.

The Society has previously held Western shows in 1955 and 1958, and fully recognizes the growing importance of this region. The 1960 event is tailored especially to meet Western needs. This year's theme is "America's success through manufacturing efficiency."

Some 200 exhibitors will display machinery, machine equipment and other products typically used in metal-working plants. In all, over 2000 different products will be exhibited. Exposition hours are Monday, Tuesday, Wednesday (November 14-16) from 1:00 P.M. to 10:00 P.M. Thursday and Friday (November 17-18) the hours are 9:00 A.M. to 5:00 P.M.

Held concurrently with the Exposition but located at the Ambassador Hotel will be technical sessions on tooling and manufacturing. Eleven technical sessions are scheduled. Subjects of the technical sessions will be: Heat Treatable Machinable Carbide, Metal Cutting Break Through, Ceramic Tools Updated, Missiles and Metals, What's New in High Energy Rate Processes, Producibility—Problems and Solutions, Processes of the Future (electroforming, plasmarc coating), Precision Barrel Finishing, Numerical Control and the Machine Tool.

A number of plant tours have been scheduled: *Tuesday, November 15*—AiResearch Manufacturing Co., 8:00 A.M.; Douglas Aircraft, 1:00 P.M. *Wednesday, November 16*—North American Aviation, Inc., 8:00 A.M.; Mc-

CHAIRMAN, Los Angeles Host Committee is Rudolf Regen, Chief Engineer of General Machine Works, Los Angeles.



Culloch Corp., 1:00 P.M. *Thursday, November 17*—Crown Zellerbach Corp., 8:00 A.M.; Long Beach Naval Shipyard, 1:00 P.M. *Friday, November 18*—Hufford Corp., 8:00 A.M.

In the way of special events, on Monday, November 14, the California Day Luncheon will be held at the Memorial Sports Arena at 12:00 Noon. General O. J. Ritland, Commander, Air Force Ballistic Missile Division, is the keynote speaker. His topic will be "The Air Force Ballistic Missile and Space Program."

On Tuesday, a Public Affairs Forum and Tour is scheduled for 2:00 P.M. at the UCLA campus. The subject is "The Race for Manufacturing Supremacy: An Evaluation of Manufacturing Progress in the Communist World." Walter Kassebohm, Executive Vice President and General Manager, Marchant Calculators, Oakland, Calif., is panel moderator. Panelists include: *Nevin L. Bean*, Staff Engineer, Ford Motor Co.; *Henry Noebels*, Manager, Application Engineering, Scientific and Process Instrument Division, Beckman Instrument Co.; *Robert Kudlich*, Director of Computer Research and Development, A. C. Spark Plug Div., General Motors Corp.; and *Edward E. Tuttle*, Executive Vice President, Essick Manufacturing Co. The tour will include the five million dollar Western Data Processing Center, the nuclear training reactor, and the spiral ridge cyclotron currently under construction.

Steering Committee Named For Material Handling & Packaging Conference



SAN FRANCISCO material handling and packaging men named to Steering Committee for 6th Annual Materials Handling and Packaging Conference, Cow Palace, San Francisco, February 23 and 24. Meetings will be held concurrently with The Material Handling Institute Pacific Coast Show. Standing (left to right) are Hiram D. Smith, Lee Clearwater, John R. Cunningham, Robert A. Sherry; seated on the left, Ellis H. Woolley and William L. Dalton.

(Continued on page 24)

GENERAL  ELECTRIC

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get **ONE-DAY**
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For **fast** shipment specify General Electric! **Full line** of Tri-Clad® '55' motors
7½ hp and up being built **exclusively** for western industry in General Electric's
San Jose factory or stocked in major western cities.



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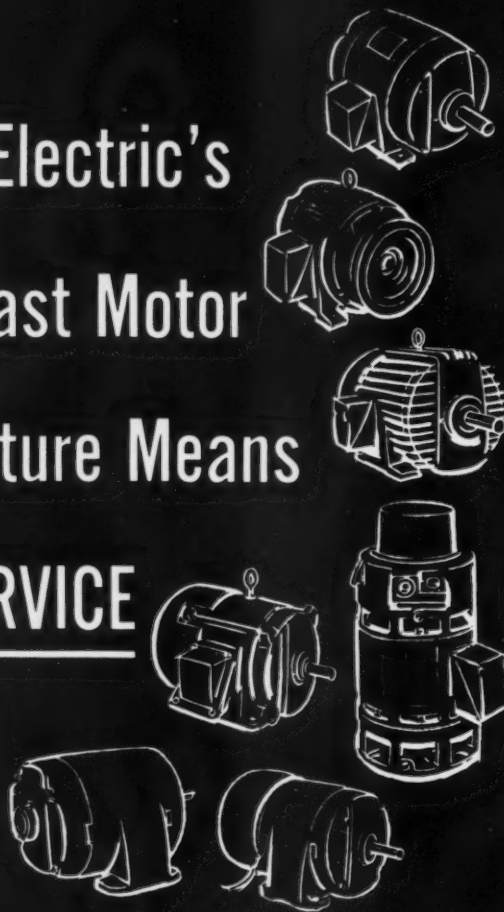
General Electric's

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FAST SERVICE

For You !



NOW you get **one-day** shipment of all standard Tri-Clad '55' a-c motors 7½ hp and up direct from major warehouse stocks in Seattle, Portland, San Francisco and Los Angeles.

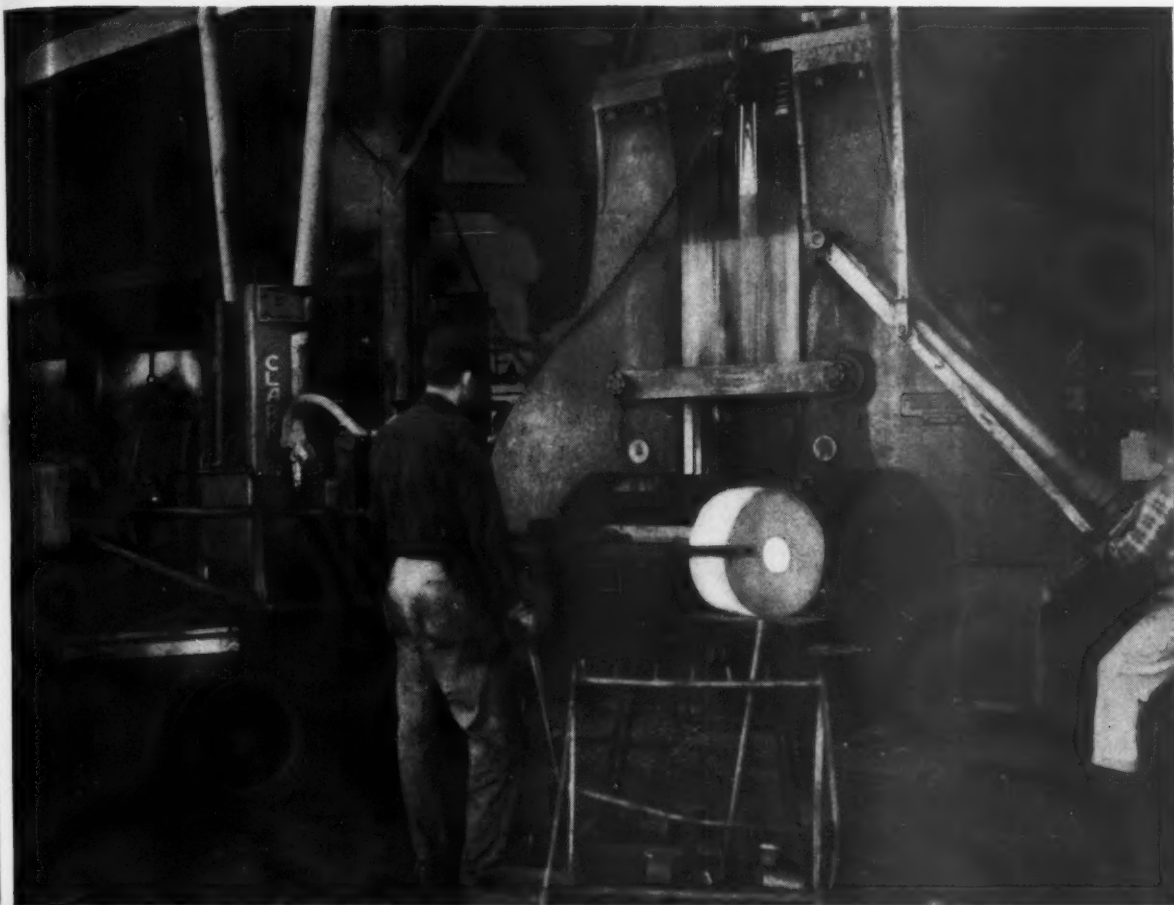
This new standard of service, coupled with three-week shipment of special configurations from General Electric's San Jose motor factory, means you gain important time savings when you specify Tri-Clad '55' motors.

General Electric's San Jose factory also offers you expert motor design and application service. For further information, contact your nearest G-E Apparatus Sales Office. 866-05

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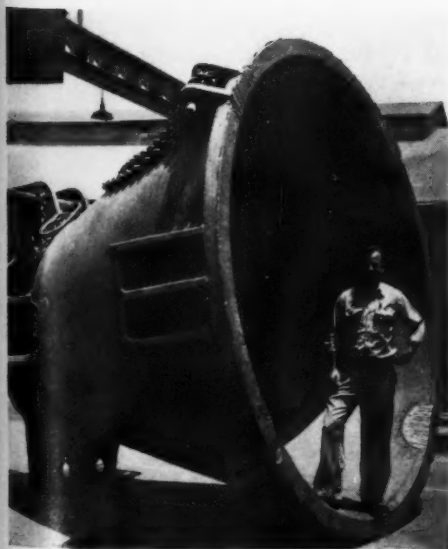
GENERAL  ELECTRIC

SAN JOSE, CALIFORNIA



Fast forging service is only one of the specialized operations you can obtain from National Supply's completely equipped Torrance plant.

How National Supply's West Coast facilities can be used to **ELIMINATE PRODUCTION BOTTLENECKS**



If you need help on solving production bottlenecks due to shortage of facilities, National Supply may have the answer. Our Torrance, California, plant is the largest integrated machinery-making plant in the West. Facilities are available for melting, casting, machining, heat treating and testing. National Supply can furnish steel forgings, billets and large bars, steel castings and special machinery. Call for information or write for quotations and delivery information.



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Torrance, California • Los Angeles Area

Subsidiary of Armco Steel Corporation



◀ This 40,000 lb. slag pot for a West Coast steel mill is shown after shot blasting. Facilities are available at Torrance for casting, forging and machining jobs.



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When the pressure is on . . .

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Thirty years of experience in pressure-type
castings is your assurance of quality.

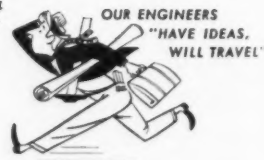
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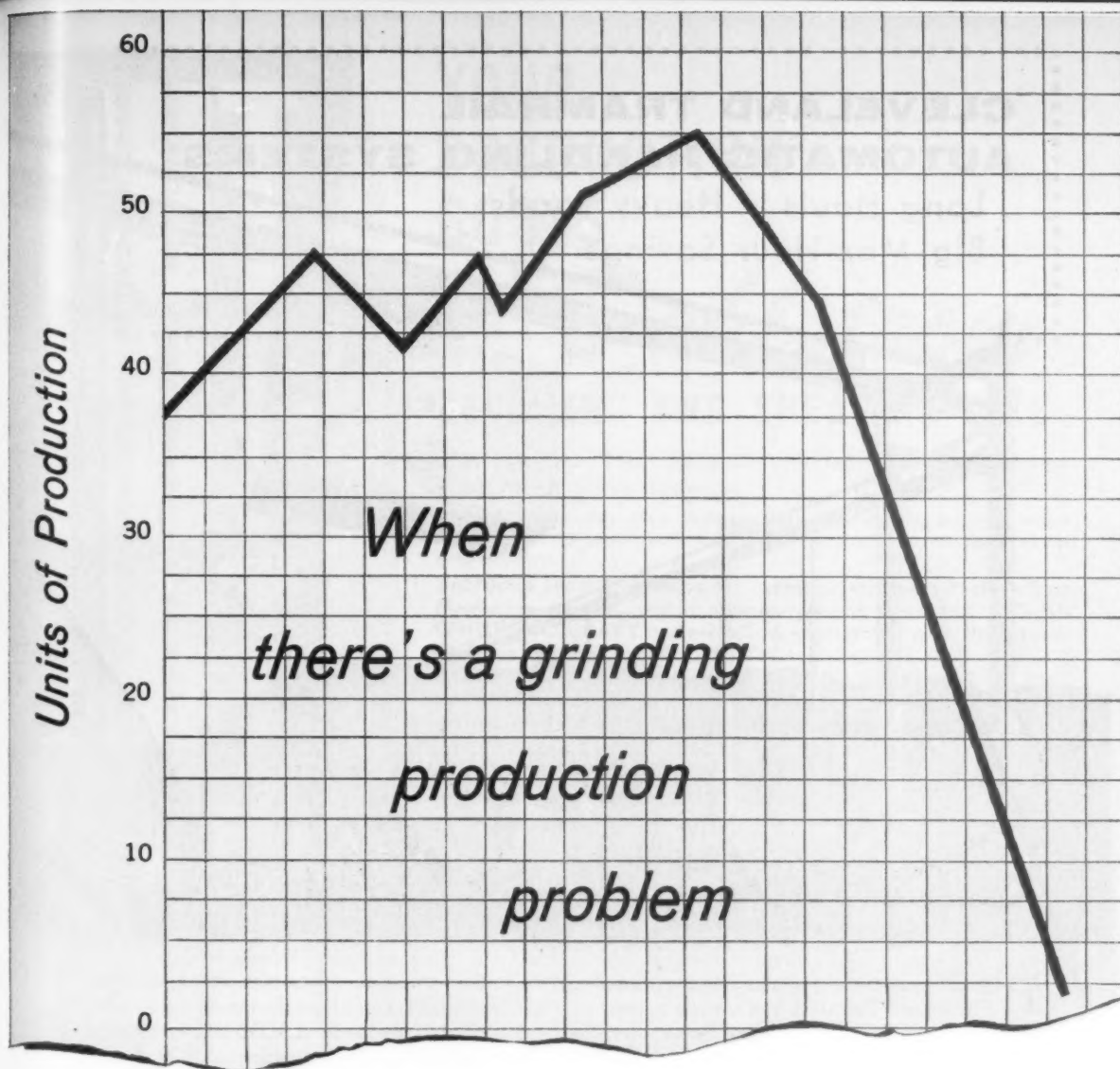
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. . . for more details, circle No. 14 on Reader Service Postcard
WESTERN INDUSTRY/NOVEMBER 1960



An Aircraft Manufacturer ran out of wheels for crankshaft-drill grinding — the need was desperate. His NORTON distributor contacted NORTON COMPANY at Santa Clara, California and in only 9 days wheels made especially for the job were on the production line.

Call your Norton Distributor

Your NORTON distributor salesman is especially trained to give you expert advice on all grinding jobs. For unusual problems he can call in the local NORTON Abrasive Engineer, who has at his command 75 years of NORTON Grinding Wheel "know-how" — assuring you prompt

service and the lowest cost-per-piece ground.

Through your NORTON distributor you have immediately available good local stocks, a complete line of abrasive products and the services of the entire NORTON West Coast organization . . . experienced abrasive engi-

neers and the modern facilities of NORTON COMPANY at Santa Clara, California.

When you have a grinding problem — call your NORTON distributor. NORTON COMPANY, District Office, 5905 Pacific Boulevard, Huntington Park (Los Angeles), General Offices, Worcester 6, Massachusetts.



W-1999

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BERN-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

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CLEVELAND TRAMRAIL AUTOMATIC HANDLING SYSTEMS

Long Hauls • Heavy Loads
Big Man-Hour Savings



ROBOT materials handling systems are here. Cleveland Tramrail has a wide variety of them in use in many plants. Some operate inside, some outside; some between machines, departments, or building floors; some between distant plants (as illustrated above). Some carriers travel between two points; others serve as many as 126 stations.

Operators are not needed for robot carriers. Pressing a button sends a carrier on its way. At the delivery point it stops automatically. After unloading and reloading, pressing another button returns it to the original

station or to some other station as selected.

Cleveland Tramrail automatic carrier systems are available for loads of 1000 lbs. to 10 tons. They will lift loads to heights of 100 feet, if necessary, and carry them for practically any distance. Some carriers even unload and return automatically.

The man-hour-saving possibilities that Cleveland Tramrail Automatic Handling Systems offer you are tremendous—and there are other important advantages. It will pay you to get acquainted with this rapidly spreading idea of materials handling.

GET THIS SPECIAL REPORT
Write us for your free copy of
"AUTOMATIC DISPATCH PORTFOLIO"
Gives data on a variety of cost-reducing
automatic handling installations.

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CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

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WESTERN INDUSTRY/NOVEMBER 1960

CUT CUT CUT

YOUR PRODUCTION COSTS

WITH A *Dahlstrom* DECOILING AND SHEARING LINE

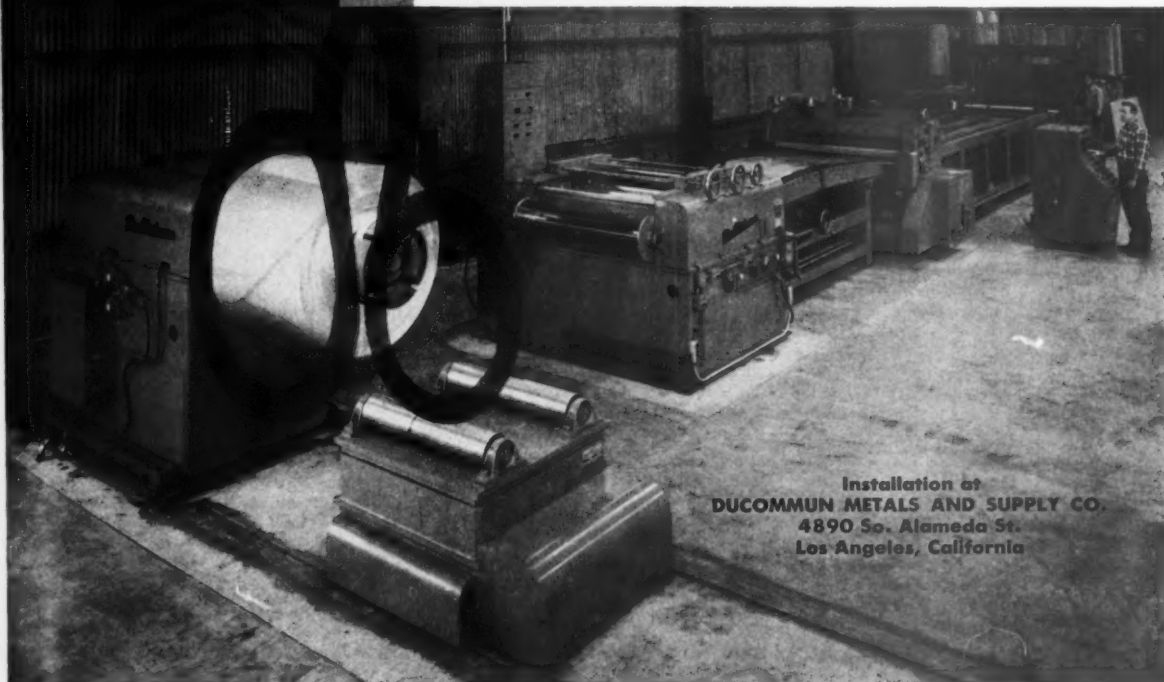
FEATURING THE EXCLUSIVE Dahlstrom Positive Stop Measuring System.

You can cut your costs with a Dahlstrom Shear Line by buying coil stock instead of sheets. This will permit you to cut direct non-standard sizes reducing scrap and sheet inventory.

Dahlstrom Shear Lines have the exclusive Dahlstrom Positive Stop Measuring System, which assures you of Consistent CUT-TO-LENGTH ACCURACY and motorized changeover with direct reading to a decimal counter. THIS IS IMPORTANT AND SHOULD BE THOROUGHLY INVESTIGATED BEFORE YOU BUY ANY SHEAR LINE.

Dahlstrom Shear Lines are available with the Positive Stop Measuring System or Electronic Surface Measuring, or both, (Dual Measuring) to give extreme flexibility in processing coil stock into sheets.

Look into the potential savings possible. Write today.



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Dahlstrom  **MACHINE WORKS**
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Roll forming machines, flying cut-off presses, coil reels, coil lifts, roll straighteners, press feed lines, decoiling and shearing lines.

West Coast Reps.: J. A. Schaefer Co., 6000 Sunset Blvd., Hollywood 28, California • Batina Machinery Co., 72 East Third Ave., San Mateo, California

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MEETINGS

(Continued from page 16)

Plastics Engineers Hold Corrosion Conference

A REGIONAL TECHNICAL conference on Corrosion sponsored by the Golden Gate Section of the Society of Plastics Engineers was held in October, at the Mark Hopkins Hotel, San Francisco. A total of 10 technical papers were presented on the subject. At the luncheon session SPE National President G. W. Martin discussed future growth and plans for SPE and lauded the Golden Gate Section for their work in developing an outstanding conference. Feature speaker was W. D. Bolton, manager, General Products Division, Development Laboratory, IBM Corporation, San Jose, Calif. Bolton talked about the impact that chemistry is having on the electronics industry and computers. He commented on the possibility that in the future many computer functions, now done electrically, might be accomplished chemically. Bolton also listed some of the areas where chemistry has been used in developing IBM's present computers.

Plant Engineers Discuss White Rooms

A SYMPOSIUM on white rooms, work areas that are subject to close environmental controls over dust, moisture, and temperatures was held by the Phoenix, Arizona Chapter, American Institute of Plant Engineers.

According to Chris Gort, plant engineer, Sperry Phoenix, and vice president of the local AIPE, industrial experts from West Coast and Southwestern areas met at Arizona State University, Nov. 1, to discuss the art of controlling conditions in white rooms to standards that a few years ago were considered impossible.

Speakers included representatives from research labs, missile and guidance control industries, as well as space age electronic industries.

Arthur K. Baker, president of Baker Instruments, Inc., Chandler, Ariz. was keynote speaker and presided over technical sessions. Dr. Lee P. Thompson, College of Applied Arts and Sciences, ASU, was host for the symposium.

Visitor at Meeting of Northern California Chapter, American Material Handling Society



EDWARD SULLIVAN, Region VII Vice-President of American Materials Handling Society and a member of the Los Angeles Chapter, attends the Board meeting of the Northern California Chapter held on October 11 at DiMaggio's in San Francisco. In the photograph, left to right, are: Front row—Edward Sullivan and Northern California members A. Hamre, Membership; John Sullivan, Vice-President, and Howard Fisher, Treasurer. Back row—Dan Billings, Secretary; Leo Delventhal, President, and V. E. Dyckman, Publicity. Also attending but not shown are Frank Schurr, Program, and Ellis Wooley, Special Activities.

Calendar of Western Meetings

Nov. 17-18 — 2nd WESTERN PALLET USERS' CONFERENCE. Statler-Hilton Hotel, Los Angeles. National Wooden Pallet Manufacturers Association.

Dec. 12-15 — ATOMIC INDUSTRIES EXHIBITION. Masonic Auditorium, San Francisco AIF, Fairmont Hotel; ANS, Mark Hopkins Hotel, San Francisco.

Jan. 23-Feb. 2—1961 ENGINEERING & MANAGEMENT COURSE. Los Angeles Campus, University of California. Reno R. Cole, College of Engineering, U. of C., Los Angeles 24.

Feb. 1-3—2nd WINTER MILITARY ELECTRONICS CONVENTION. Biltmore Hotel, Los Angeles. National Professional Group on Military Electronics and L. A. Section, Institute of Radio Engineers.

Feb. 16-19 — INTERNATIONAL AUTOMOTIVE SERVICE INDUSTRY SHOW. Los Angeles Memorial Sports Arena. Pacific Automotive Show.

Feb. 20-22 — WINTER MEETING, PLUMBING BRASS INSTITUTE. Riviera Hotel, Palm Springs, Calif. Plumbing Brass Institute.

Feb. 22-24—MATERIAL HANDLING INSTITUTE PACIFIC COAST SHOW. Cow Palace, San Francisco. Material Handling Institute.

Feb. 26-Mar. 1—PACIFIC ELECTRONIC TRADE SHOW. Great Western Exhibit Center, Los Angeles.

Mar. 12-16—ASME AVIATION CONFERENCE. Statler Hilton Hotel, Los Angeles. American Society of Mechanical Engineers.

Mar. 16-17 — CONFERENCE ON DATA PROCESSING PROBLEMS. Numerical Analysis Laboratory, University of Arizona, Tucson, Ariz.

Mar. 20-24 — WESTERN METAL EXPOSITION AND CONGRESS. Pan-Pacific Auditorium, Los Angeles, Calif. American Society for Metals.

Mar. 23-25 — MEETING OF AMERICAN MACHINE TOOL DISTRIBUTORS ASSOCIATION. Mark Hopkins Hotel, San Francisco. American Machine Tool Distributors Ass'n.

Mar. 27-29—ABWA SHOW OF 1961. Riviera Hotel, Las Vegas, Nevada. American Bottled Water Association.

Apr. 20-21 — RAILROAD CONFERENCE. Sir Francis Drake Hotel, San Francisco. Jointly sponsored by American Society of Mechanical Engineers and American Institute of Electrical Engineers.

Apr. 20-21 — 18th ANNUAL WESTERN SECTION CONFERENCE, SOCIETY OF THE PLASTICS INDUSTRY, INC. Hotel del Coronado, Coronado, Calif. Society of the Plastics Industry, Inc.

May 8-12—CASTINGS CONGRESS & EXPOSITION, National Meeting of AFS. Brooks Hall and Civic Auditorium, San Francisco. American Foundryman's Society.

STANDARD ENGINEER'S REPORT



Versatile Chevron Duraplex replaces five other greases at paper mill

New Chevron Duraplex Grease EP works round-the-clock at the Pacific Coast Paper Mills in Bellingham, Washington. This versatile grease provides a simplified program of plant-wide lubrication . . . replacing 5 other greases previously used to do the job.

"We've used Chevron Duraplex for over 2 years now," reports Machine Room Superintendent Leonard Torgeson "... it's convenient—eliminates chance of costly error, and does an outstanding job in spite of extreme shock loads, high temperature and moisture condi-

tions. We use Duraplex on over 40 different papermaking machines plus a large system of conveyor belting."

Pacific Coast Paper, a division of Puget Sound Pulp & Timber Co., produces over 90 tons of facial quality paper each day. Their MD and Powder Room Tissue brands are widely-known throughout the country.

Equipment Note: This plant's huge 16 foot Yankee Drier paper machine is the largest in the U.S., contains some 300 separate grease points. Bearings operate under extreme pressure, at

high speeds and temperatures.

Chevron Duraplex Grease — EP is the ideal multi-purpose industrial lubricant. It is suited to a wide range of temperatures, loads, speeds, moisture and extreme service.

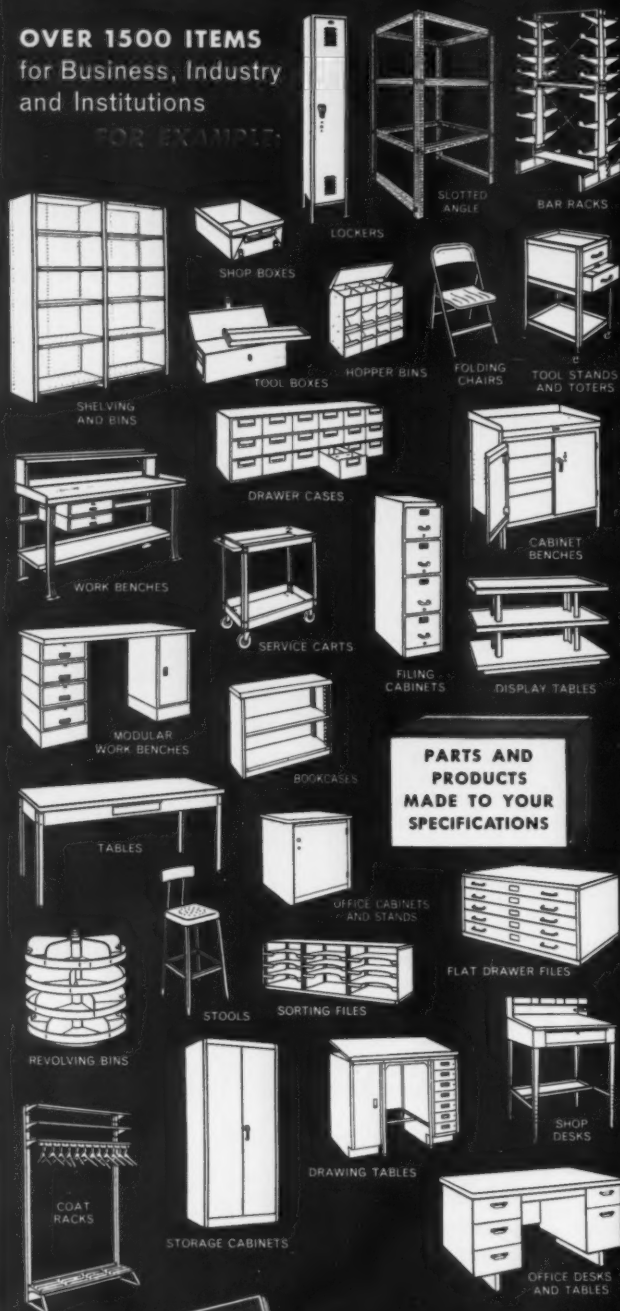
Lubrication problems? let a technically qualified Standard Engineer solve them for you. The largest field force of lubrication engineers in the West is at your service. For this valuable free technical help, just call your local Standard office, or write Standard Oil Company of California, 225 Bush St., San Francisco 20.



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from our

NEW WEST COAST FACTORY

**900 South Turnbull Canyon Road
City of Industry
Los Angeles County, California**

*Modern 160,000 square foot plant for
manufacturing the world's most com-
plete line of quality steel equipment*

Faster delivery and better service for Lyon customers throughout the West Coast area—that's the practical reason for the Lyon streamlined factory located in the City of Industry, just 18 miles from downtown Los Angeles. In addition to complete manufacturing facilities, this new plant also provides generous warehousing space. A separate wing of the structure houses the modernly designed offices of the Los Angeles district sales staff.

Largest in its field, Lyon manufactures more than 1500 steel equipment items. The panel at the left indicates the unusually diversified line of products with which Lyon serves practically every segment of business and industry.

LYON METAL PRODUCTS, INC.

General Offices: 1140 Monroe Avenue, Aurora, Illinois
Factories in Aurora, Ill.—York, Pa.—Los Angeles
Dealers and Branches in All Principal Cities

LYON[®] METAL PRODUCTS

... for more details, circle No. 19 on Reader Service Postcard
WESTERN INDUSTRY/NOVEMBER 1960



LAZY SUSAN used in assembly for switches. Switch in center is used as model to copy, a procedure followed throughout all assembly operations. Note in background roller conveyor with units in cradles. A similar conveyor is hidden in foreground and has been converted into a bench by addition of a table top.

PRODUCTION EFFICIENCY

A SPECIAL

western
industry

REPORT

Mass production is not the only way to increase efficiency. Here's how one Western firm does it.

HOW TO INCREASE production efficiency is a continual question in industry. It's a question that's being asked more and more these days, not only in the West but all over the country. Companies are experiencing rising costs in labor and materials, which in many cases must be absorbed. Some of our industries are having to compete at home with

a flood of foreign equipment being sold at lower prices. Whatever the causes are, it is generally true that manufacturers today more than ever before are faced with the problem of reducing manufacturing costs.

There are a number of different actions firms have taken to reduce costs. Standardization of product, and



PACKAGING of completed units is an integral part of each plant's assembly operation. Here two men pack an instrument prior to sending it to shipping.

ROLLER CONVEYOR at right angle to assembly lines is designed to feed finished units to packaging section. Raised sections are at aisles and can be easily lowered.



cutting sales and distribution costs are typical of this effort. However, one of the most effective actions a firm can take is to increase its production efficiency. Here in the West this problem is not a new one. Many Western manufacturers for years have been faced with the problem of competing with those in the East who have advantages of lower material and labor costs and larger more efficient production runs. These advantages are offset only by shipping costs to the West. As a result, Western manufacturers have had to learn how to run their plants in an efficient manner. They have discovered through necessity ways to reduce costs and increase production efficiency, even though most of them are unable to employ the Eastern techniques of high volume manufacturing.

While many items contribute to production efficiency, there are two important areas where the West

has differed and which seem to be typical of this part of the country.

One is in the purchase of modern equipment, equipment that will best do the job. It has been proved many times that the purchase of new equipment will pay for itself, and that the use of old machines, even those in good condition, but not as efficient, will cost a company money. Western manufacturers are far ahead of those in the East in practicing this all important point. They seem to have an interest in and a willingness to accept new equipment ideas. The average Western plant has much newer equipment than is found in the East. At least part of the reason why this is so, lies in the fact that industry in the West is newer. Its plants are newer too, and its production people, somewhat separated from the rest of the country, have developed their own ideas suitable for their own type of production.

While new equipment is extremely important to increasing production efficiency, of equal or even more importance is the method used. Some Western plants through necessity, because of their type of manufacturing, have developed a method of production almost diametrically opposite to that recognized as standard in the East. This method achieves efficiency through placing people in small integrated units. It follows the idea that people, if they so desire can make up in efficiency what is lost by not having high volume production. Not all Western firms follow this technique and not all of those following it do it in the same way or completely. Enough firms, however, subscribe either knowingly or unknowingly to the basic idea to make it important in the West.

One of the best examples of such a firm is Hewlett-Packard in Palo Alto, California. This company not only has an extremely effective production method but it utilizes the very newest in production equipment to do the job required.

Hewlett-Packard follows a manufacturing philosophy which President David Packard refers to as "Management by Objective" and contrasts it with another philosophy which he calls "Management by Control." In "Management by Objective," the objective is to efficiently produce a good product. To fulfill this objective, an individual is given all the tools, equipment, and people to do the job, and all the aid he requests. From then on, it is up to him to get the job done. As a part of this philosophy, the firm believes that the individual and individual initiative is all important. To keep this individuality, manufacturing is broken down as much as possible into small complete units. As a contrast, "Management by Control" is the control of factory operations from a central point. Here data is collected and analyzed and from this information decisions are made and relayed to the plant.

Hewlett-Packard is an electronics firm manufacturing a number of varied complex and precise electronic instruments used for testing, measuring, and controlling. The firm employs some 2,700 persons, most of them in manufacturing. They have broken down the manufacturing of different instruments into three divisions. Each division covers groups of similar instruments and production of each group is located in one building. At the new Hewlett-Packard headquarters

and manufacturing complex recently completed in Stanford Industrial Park, Palo Alto, two of the four buildings contain separate manufacturing plants. Each building is of two stories. Assembly operations are located on the top floor and basic parts manufacture for these operations on the lower floor.

Thus, production has been broken down into integrated units, and all instruments of certain types are built completely in one building. This means that all parts for these instruments are made in the building and the instruments are assembled, tested, and packed ready for shipping in that building. Each building is considered a separate plant and has a plant manager in complete charge of the building. He is responsible for all plant production.

The building housing plant #2 which produces electronic instruments other than microwave instruments, such as voltmeters, counters, oscillators and amplifiers is further broken down to basic part manufacturing and assembly operations. Basic part manufacturing is on the lower floor and a fabrication manager is located there. For assembly operations a production manager is located on the top floor. Both men are in complete charge of and responsible for their units. Each floor contains 43,000 sq. ft. and the total plant has a work force of approximately 600 persons. One item of interest is that there are no office cubicals or separated offices in the plant. Everything is in the open and on the top floor where the plant general office is located: all desks for executives, clerks, typists, etc., are grouped together in one open area, immediately adjacent to assembly operations. This makes plant executives easily accessible and gives a feeling of unity to the whole room.

The production manager has three division managers under him. These men divide up and control nine assembly and testing lines plus an operation designated as prefabrication. Under each of them are some 110 assembly and testing personnel of whom about 60% are women. The division managers have desks also in the open, but in the center of the room. With them is a woman designated as a staff assistant. Her

duties are to take care of the problems of the women in the plant and she functions independently serving as a combination confidant, housemother and army chaplain. She is always someone who has worked on assembly and knows the situation in that respect. She is selected because of her personality and talents, and handles on her own, a wide variety of personal and plant problems pertaining to women. If need be, she has the ear of the plant manager or any other plant executive to get information or solve a problem.

Each assembly line has a line supervisor. He is in charge of the complete line including wiring, assembly and testing. He is also in charge of fabrication of sub-assemblies for his group of instruments. Key personnel on the line are women group leaders of the wiring and assembly groups and a test line leader. The test line leader is a man who is in charge of testing methods. Though he is under the line supervisor, he has a high amount of technical knowledge and decides how units are tested, but not what units are to be tested.

The assembly line itself is interesting. It starts at the center aisle and runs 70 feet to the side aisle of the room. It then comes back to the center aisle. The line continues across the aisle where the testing is done. On this side, the line is 50 feet long and ends at a roller conveyor running at right angles to the assembly line, almost the length of the room. Finished units are placed on this and rolled to packaging, an operation located in a convenient corner of the room.

All lines are designed for complete flexibility. In general, any line can be easily and quickly changed to assemble any of the units made in the plant. The reason for this lies in the fact that lines are made up of Rapistan roller conveyors. When it is necessary to assemble certain items that will not themselves roll, the items are placed on boards similar to breadboards. When assembly calls for bench work rather than rollers, bench tops are placed over the rollers. This allows a flexibility not only between lines, but within the line itself.

Each line is equipped with ample outlets for air and electricity. Air tools used are Ingersoll Rand preset



GRID SYSTEM of numbering plant areas permits racks such as this to be located in any usable space, and items to be stored in any open bin. System also eliminates central parts depot and reduces number of bins needed for parts storage.



ASSEMBLY LINE, looking from end of line where testing is done. Note use of roller conveyors. All but two of the nine lines are composed of roller conveyors. When a stationary area is desired, a bench top or board is placed over rollers. Production men at the plant believe that this use of conveyors is a major reason for the complete flexibility of assembly lines.

torque type. The electrical outlets provided will satisfy any test needs. Two special jigs are used throughout assembly. These have been standardized to further facilitate flexibility. One is called a cradle which holds heavier instruments and allows them to be turned without lifting. The other is a Lazy Susan which has two fixtures on it. One of these holds switches, the other holds resistor boards. The Lazy Susan can thus be used in the assembly of either item.

This assembly line works efficiently because, as with the plant, one man is in charge of the complete unit. If an error is made and discovered in testing it can easily be corrected in an informal manner by the tester taking the unit back to the assembly part of the line. It is all one line and there is no problem of going through channels. The small group working together and doing a complete job, makes it easy for personnel to work with efficiency and keep quality high. Persons at the start of the line see the finished item going off the end of the line and know what they are making and what they have contributed to it. Then too since the line is flexible the work is not monotonous since workers are producing many different instruments.

Besides the nine assembly lines the top floor contains a section called prefabrication. Here certain sub-assembly jobs are done which do not lend themselves to assembly line work because of specialized machines, special skills or a need for a controlled environment.

On the lower floor, the same situation holds true. The personnel in plant #2 are producing parts, which in general, are used by the upper floor. This includes sheet metal fabrication such as stamping, forming, riveting, as well as painting, finishing work, plastic mold-

ing, and engraving. Through the plant manager, these activities are tied into assembly upstairs. Study is being made to see if the lower floor operations can further be unified and tied still more closely to individual assembly operations. Much of the equipment used is not only new but has been purchased to best solve the production problem in the plant. Hole punching is done on any of three groups of machines, depending upon production. These range from single punch presses to a Weideman machine which punches individually from a template, to a high production press which uses a die set to simultaneously punch all holes.

Plastic molding is an operation which because of its nature has to be centralized. Parts are molded for other plants of Hewlett-Packard in addition to those parts used by plant #2. This is one of the few exceptions to the firm's concept of unified plant production.

Another interesting method which contributes to efficient production is the gridded stock storage system. Floors are divided into numbered areas. Racks are set up at any convenient location. Rack sections are lettered and shelves are numbered. With this three part location code any shelf in the building can be used to stock any part and it can be quickly located. The system also eliminates much of the storage space which would be needed if racks were marked for specific parts.

Storage space on the top floor is for subassemblies. These are made on assembly lines for future jobs going through those assembly lines and are stored by the line supervisor awaiting use. He uses a three card system marking the box with one card, holding the other, and sending the third to plant inventory control. When



FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

FALK all-steel Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) inherently stronger gear teeth (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

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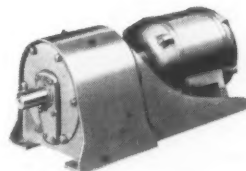
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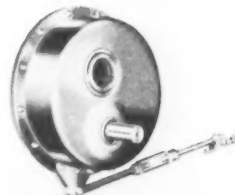
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PARTS MANUFACTURE is done on lower floor. Machines used are determined by part volume. Note room is very similar to assembly room shown in other pictures.

ready for their use, he draws them out himself, an efficient way of eliminating a large separate stock control operation. On the lower floor storage racks are provided in the same manner for sheet metal items, molded parts and purchased items. These parts are made as required by assembly line schedules and stocked until needed. They are drawn out by the line supervisor.

An unusual sidelight to part stocking is found in assembly where a separate group of bins each contain a few replacement assembly parts. These are considered uncontrolled stock and if a part breaks and another is needed quickly the line supervisor draws one from there. It is later replaced by making one up in assembly.

An integral part of this whole production concept is what Hewlett-Packard plant executives call "Bottoms Up" scheduling. Each of the line supervisors is given a broad framework of production needs. He is told what his line will have to make over a period of time. It is then up to him to determine how he will allot his time and how he will use his personnel. He determines the complete scheduling of his own line.

Each week line supervisors fill out a line schedule for four complete weeks in advance and with a tentative week of scheduling. They give such information as when subassemblies will be started for a certain instrument, when assembly will start, when cabinets will be needed, for how many units, and how many days testing will continue. This schedule is approved by plant production control and a master schedule made up. The schedules are made up in the form of a Gantt chart. From the master schedule, information concerning production timing of cabinets, painting, engraving and riveting is obtained and followed by the lower floor. In this way part production is closely tied

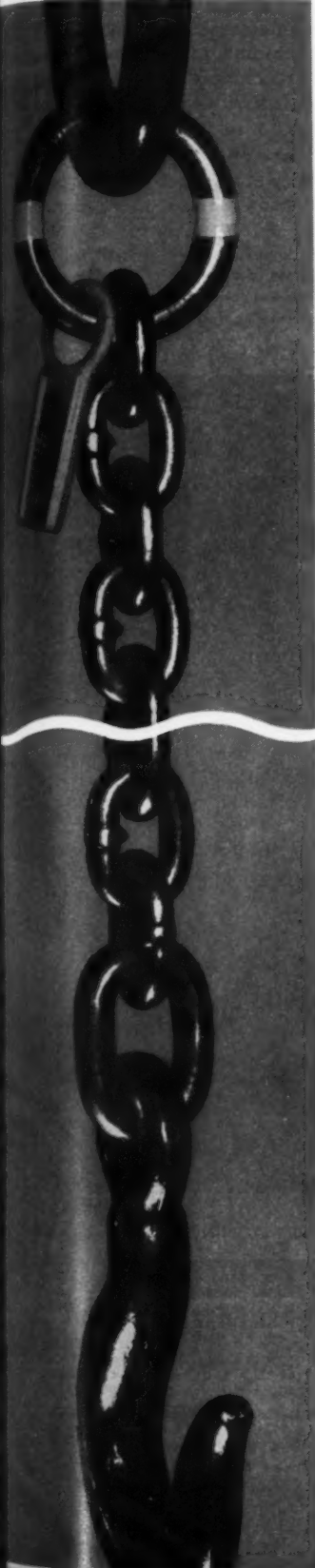
into need.

The "Bottoms Up" scheduling eliminates extra staff personnel and places the responsibility squarely on the line supervisor. He has been given the freedom to decide exactly how he will do the job and what he will need. Getting it done is his responsibility. This includes the complete job from the time he gets the parts to packaging.

This whole production concept is designed to encourage a spirit of individual initiative as well as careful work and pride in the products made. The bonus system is another example of this company belief that production efficiency lies in the individual. All production quotas are figured in dollars. The company has determined that 30% of the dollar value of their products is labor cost. If labor costs are less than this ratio for a period of three consecutive months, then the employees are rewarded accordingly in the form of a bonus. All persons in the company from the president down are included in the bonus. The bonus is figured together for all three of the plants and has helped create a company spirit of cooperation. Here is one example of how this has added to production efficiency. If they don't think the blueprint is correct, sheet metal men now go upstairs to assembly and double check the print against the actual item.

Hewlett-Packard is an electronic firm and employs personnel of a high level of intelligence. This together with the type of products it manufactures makes the production concept the firm has adopted particularly well suited to its operations. Basically, however, this idea that efficiency lies in the actions of people is still valid for all firms; and when efficient personnel are provided with the best equipment, the combination of the two results in an extremely efficient production operation.

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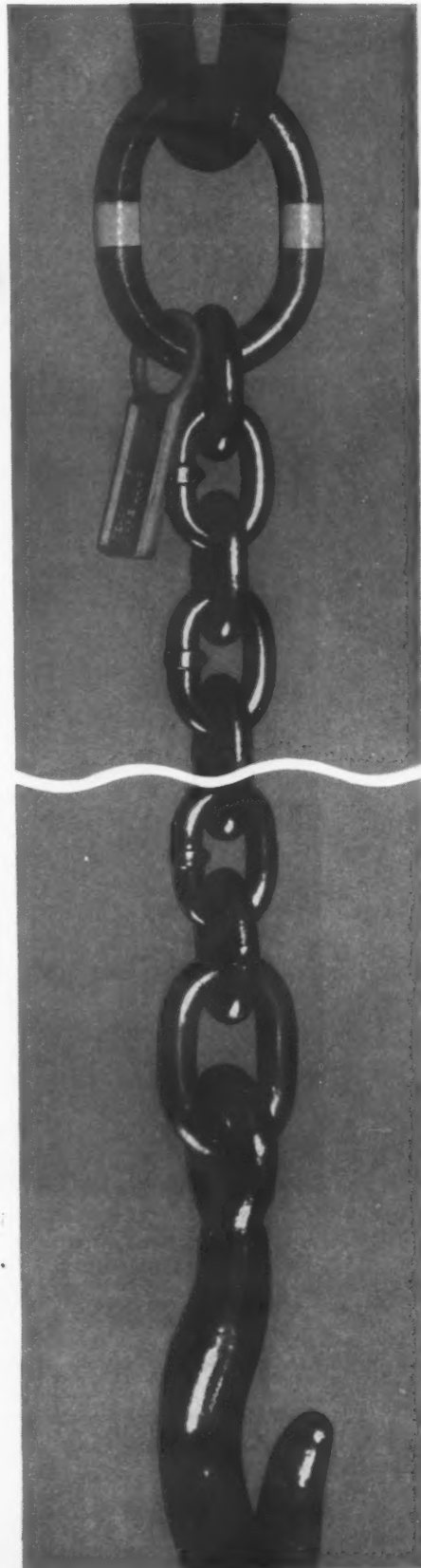


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western
industry



PREVENTIVE MAINTENANCE on cranes at ESCO includes weekly cleaning of trolley wheels and sanding of control fingers. Maintenance man Al Wetzel uses portable sander in foreground to simplify job.

PRACTICAL MAINTENANCE of cranes and hoists

Large doses of preventive maintenance plus careful selection of replacement parts make for a practical operation. The formula is practiced successfully on 100 cranes and hoists by this large Oregon foundry.

WHEN CRITICAL HANDLING EQUIPMENT breaks down in a large foundry, production comes to a sudden halt. Cranes which transport molten metal for pouring and sand for molds must be kept in operation if the foundry is to function. Proper maintenance of overhead handling equipment, such as cranes and hoists, is therefore of primary importance to plant management.

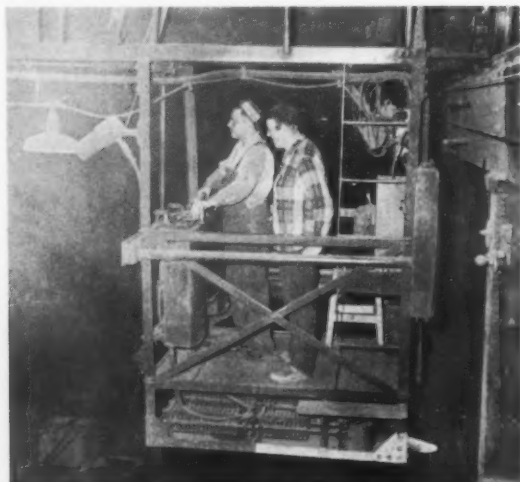
The maintenance department at ESCO's Portland, Oregon, steel foundry has an excellent record in this respect. In addition to the other equipment which

must be maintained, the department is responsible for some 100 cranes and hoists. It has been very successful in maintaining these items. Production stoppages due to handling equipment failures are at a minimum.

At ESCO they practice practical maintenance. A major part of their success is based upon a good program of preventive maintenance. Cranes and hoists have been individually considered as to location and usage. Units whose failure can seriously affect production receive the most attention. One unit, which is extremely critical to production, has a standby crane



SOME OF ESCO's newer equipment, bridge cranes in Cleaning Room. Metallic dust and sand in areas such as this make regular preventive maintenance imperative.



CRANE is given trial run after noon hour checkup. Maintenance man Al Elliott, left, with operator Gene Mortensen.

available on another overhead rail spur. The stocking of spare parts is another example of practicality. Since it is obviously impossible to stock all parts or even all parts of a critical nature, a careful study has been made and only those parts most likely to be needed are stocked. The practical decision that must be made here is to determine the possibility and probable production cost of a breakdown, if a replacement part is not available, and to weigh it against the cost of a large inventory of spare parts where the dollars spent are non-productive. The result is a practical compromise.

The maintenance department under Master Mechanic Francis Weber is responsible for maintaining the 100 cranes and hoists in operation at ESCO. Fifteen of this number are traveling cranes, which run

from 3-tons to 20-tons in size. The hoists vary in size from those with a capacity of 500 lb. to 3-tons. The cranes and hoists also vary in age with several of the cranes being up to 40 years old. Older units naturally receive more attention and closer inspection by maintenance personnel.

The cranes handle ladles of hot metal, sand and loaded skips of castings. Some cranes are used 24 hours a day. Hoists are employed for such typical operations as moving sand or handling castings. When handling is needed at a station, a hoist is employed. If the load must travel a distance then the lift is made by crane.

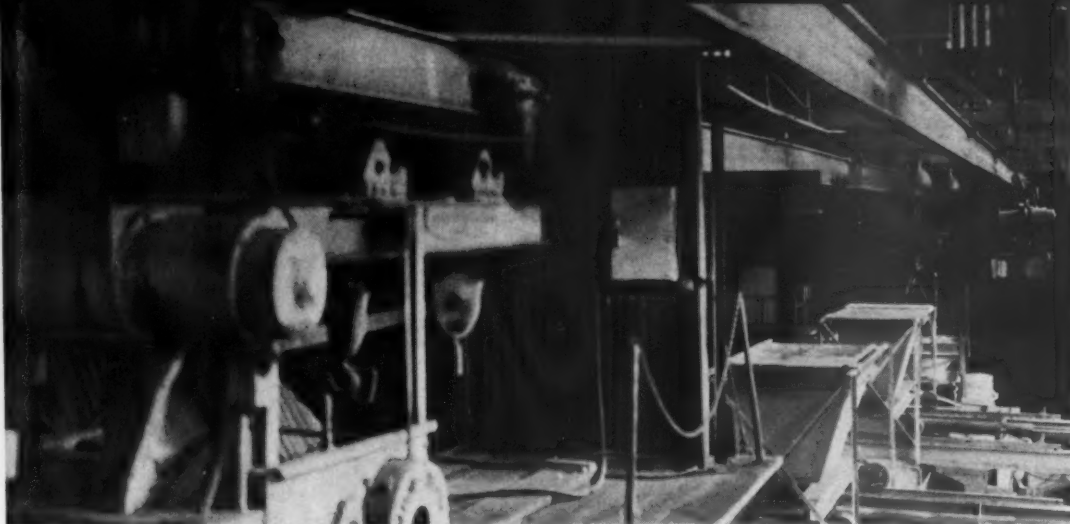
A preventive maintenance program is applied to both hoists and cranes. Regular inspections on equipment are made during idle periods. The unit then is checked for excessive wear on all moving parts and, if necessary, parts are replaced. Over a period of time from this inspection and replacement procedure the maintenance department has been able to determine life expectancy of the various parts and adjust stocking of replacement parts to needs. The method also permits replacement of parts during idle periods when it is known that certain parts will fail after an average number of days.

Basic information concerning cranes and hoists is obtained from two forms, a daily time card filled out by each maintenance man and a work order. These forms give information which, when analyzed, allow the maintenance department to properly schedule its work and also help them to determine whether maintenance costs on an old piece of equipment would justify its scrapping and replacement with a new unit.

From their inspections the maintenance personnel must determine the following

- (1) How will a breakdown during production hours affect other production?
- (2) How long will the replacement be?
- (3) What is the cost of the part to be changed?
- (4) What will be the cost in lost production?

These factors will help determine whether the part in



MONORAIL CRANE is used to keep sand hoppers filled in mechanized foundry, also fills bins for Centrifugal shop. Equipment breakdown would result in much downtime so standby crane is always ready, and can easily be switched on to the line. Standby crane in foreground. Right background shows crane working.

question should be replaced immediately or whether it is better to wait.

Hoists are not nearly as critical as cranes and a hoist failure most of the time will not shut down plant production. Then too, maintenance men have found that they have very little downtime on hoists due to failure. As a result preventive maintenance checks are made on a monthly schedule. Units are thoroughly inspected and if necessary, parts are replaced. Parts carried in stock include: brake parts, contacts, blocks, top and bottom hooks, cables, and chain sprockets. On the small 1-ton electric hoists when a motor burns out the whole hoist is replaced. One or two spare hoists are kept on hand. ESCO maintenance people have found that it is not feasible costwise to make detailed motor inspections and repairs ahead of time on small hoists. If an obvious motor malfunction is caught during inspection the hoist is replaced and the motor sent out for repair.

The preventive maintenance on cranes is an entirely different situation. Since a breakdown on most of the cranes could cost many hours of lost production, preventive maintenance here is vitally important. In a foundry, equipment is subjected to a combination of heat, sand and metallic dust. All of these are damaging to moving parts. Metallic dust is particularly harmful to electrical parts. These particles in the air tend to short out brush holders and armatures on motors. Cranes are especially affected by metallic dust. Being up high they are in a location where the overhead exhaust system tends to pull the dust in the air through them. While local dust collectors on the floor help alleviate this situation they do not eliminate it.

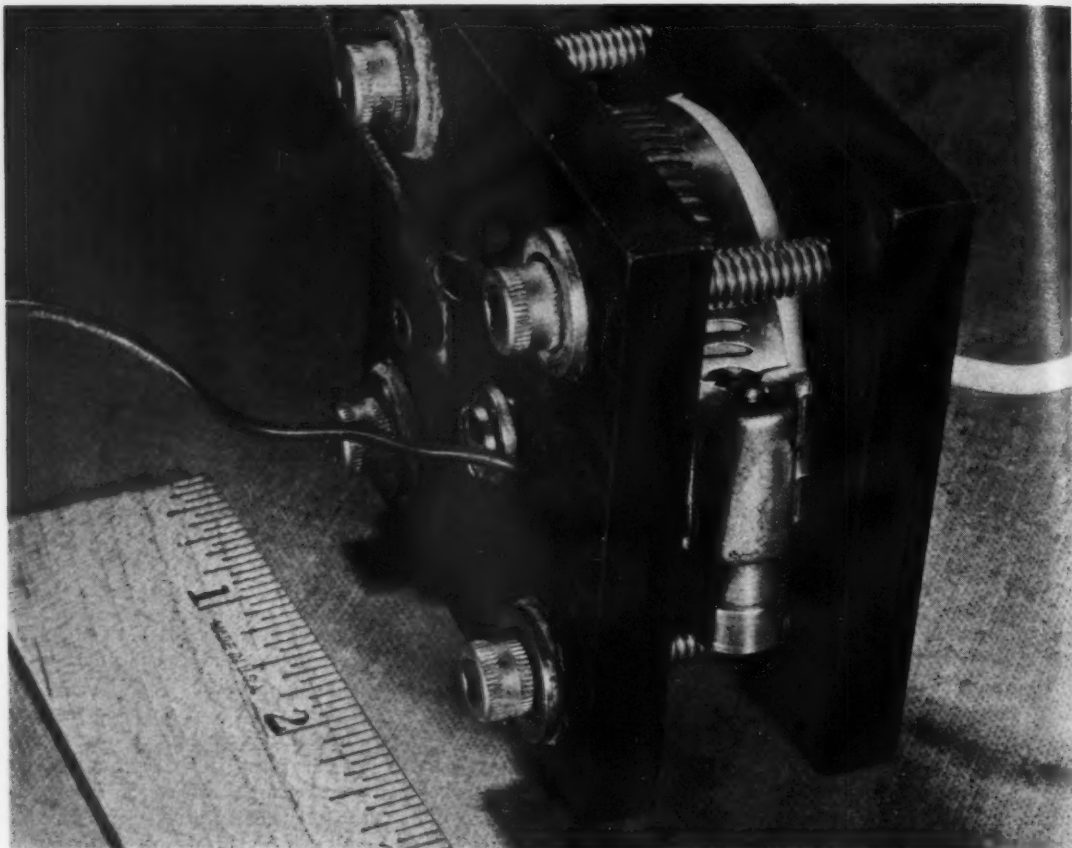
The key to keeping cranes running is constant preventive maintenance at the end of each shift. A maintenance crew of four men cleans and lubricates the controllers and checks the oil in the wheel bearings every eight hours on older cranes that use brass bearings. Each week, on Saturday, cranes are given a complete inspection, which includes checking motors, gear cases, brushes and brush holders, load brakes, cables,

and blocks and hooks. Probably the most important item is making certain that the metallic dust is removed at the end of each shift.

Since cranes are important to production, they can not be allowed to break down. A large inventory of crane parts is carried. Even with this inventory, not all the key parts can be carried. Therefore parts must be stocked on a calculated risk basis. From past experience and time cards and work orders, the maintenance department can determine many of the parts that must be carried as replacements. In addition others are carried which are considered absolutely necessary to cut downtime in case of a breakdown.

Parts stocked include armatures, coils, brakes, brake linings, and contactors. In one case, a cab monorail crane supplies sand both to bins for the mechanized molding foundry and to storage bins for the centrifugal foundry. This is an operation which, if it is halted, will shut down a large part of the foundry. The crane is also operating under very difficult conditions. Therefore a second crane is available in standby position on another rail nearby. Within 35 minutes the standby crane can be placed in operation. If repairs are needed on the monorail crane a time determination is made. If it takes over 30 minutes to make the repairs the standby crane is placed in operation; if not, then the unit is repaired. Occasionally the two units are alternated to even wear and allow detailed inspection.

Keeping cranes and hoists maintained at ESCO is accomplished in a realistic and practical manner. Preventive maintenance is tailored to fit the need. Forms and paperwork are kept to within necessary limits. Part stocking and replacement procedures are determined on a calculated risk basis. Here the risk is determined individually from previous experience and judgment on what action will best serve. Keeping vital equipment in operation with a minimum of downtime and at a reasonable cost is a difficult operation similar to walking a tightrope. It is also good maintenance and ESCO practices it.



REGENERATIVE FUEL CELL HAS COMPACT DESIGN, is less than 4-in. square. Outer casing is secured between plates held in place with socket head cap screws. Device has charge/discharge efficiency of more than 50%.

SMALL FUEL CELL has design simplicity

One sign of good basic design is simplicity. This unit has it.

STARK SIMPLICITY OF DESIGN is evidenced in an experimental model of a regenerative fuel cell for use in space vehicles but with potential of inexpensively powering conventional electrical devices.

The fuel cell, developed by Electro-Optical Systems Inc., Pasadena, Calif., made its debut at the American Rocket Society meeting Sept. 28 in Los Angeles.

The device simply consists of two circular metallic outer casings that are joined together with a clamp and sealed with a teflon gasket. Imbedded in the center of each casing is a circular asbestos bed with an electrode contact.

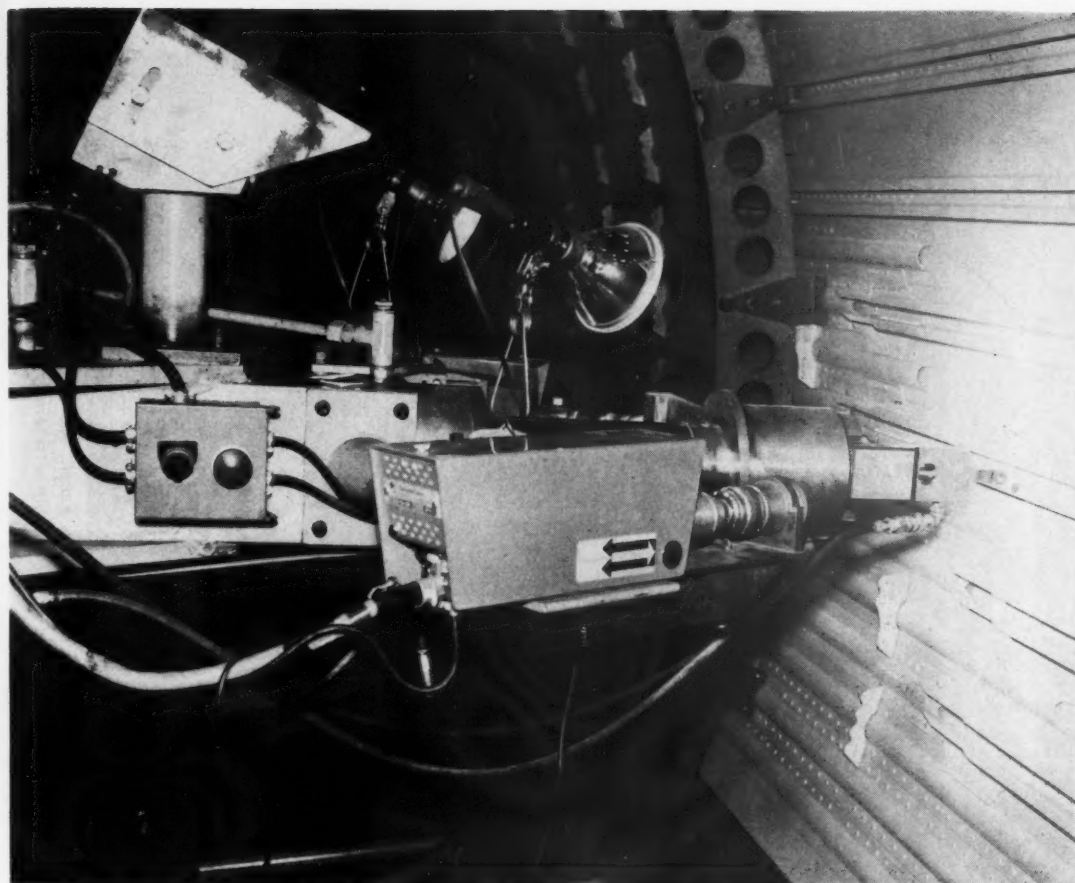
In one bed is placed a hydrogen treated sintered nickel electrode, in the other a lithium hydroxide

treated electrode of the same material.

An atmosphere of hydrogen and oxygen and water vapor is trapped within the cell to store and restore large amounts of electricity. Indications are the cell can be completely discharged many times and recharged without damage to its performance.

The EOS fuel cell will provide a 15-75 watt-hour-per-pound output, whereas current nickel cadmium batteries, for example, yield less than 5 watt-hours-per-pound after thousands of cycles.

The cell is designed to operate between room temperature and 150 C. When the cell is charging, water is broken down into hydrogen and oxygen. When the unit discharges, the process is reversed, thereby giving off energy as the solution regains its previous form.



CLOSEUP VIEW OF TELAUTOVISION camera shows its position in relation to rivet ram located in blind area behind fuselage panel. As ram centers on pilot hole, operator can check its position in relation to reticle circle flashed on monitor screen.

INDUSTRIAL TV for machine control

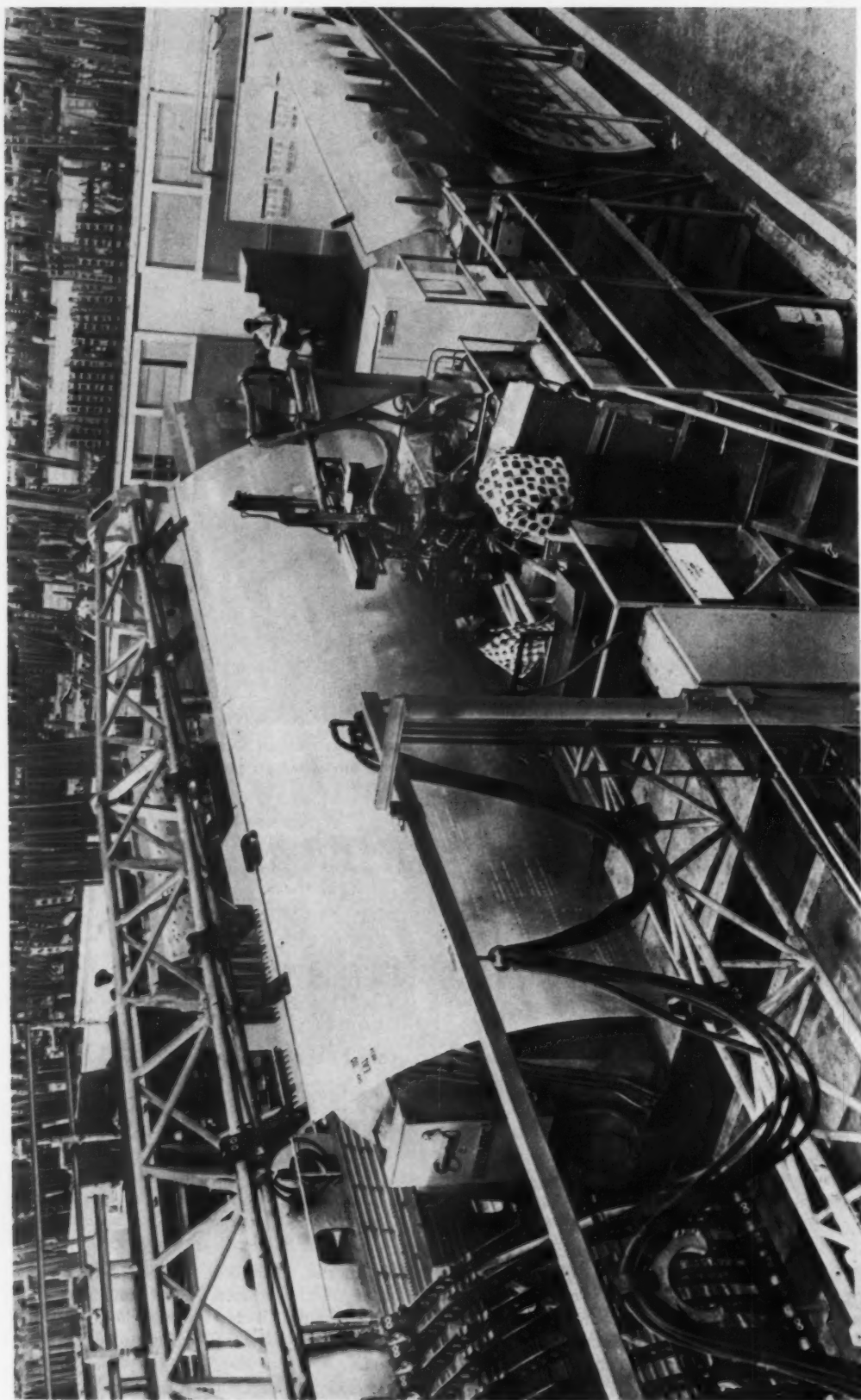
Remote control drilling of accurate holes is one of many jobs where closed circuit television can be used to advantage.

TECHNIQUES TO HELP PLANT WORKERS perform complex industrial tasks as well as routine and repetitive functions are being advanced in the West through use of closed circuit television applied to diversified operations including machine tool control, traffic management and plant security.

At the Douglas Aircraft Co. DC-8 assembly plant

near Los Angeles, engineers are using closed circuit television to improve efficiency of an automatic riveting machine that drills holes, positions and upsets aircraft-type fasteners to a non-accumulative tolerance of .0030-in.

While working with General Electro Mechanical Corp. on installation of a Drivmatic riveter for fuse-



OPERATOR SITS AT CONTROLS of huge automatic riveter shown working on 30-ft. panel. Ram, hidden from view of operator, is seen on monitors alongside worker, right. Machine can be stopped instantly with deadman switch held by operator.

→

CHECKING MONITOR
of closed circuit system
for automated classifica-
tion yard, engineer Jack
Doze stands to right of
camera setup that will be
housed in weatherproof
buildings.



lage assembly, it was clear to Douglas plant engineers that due to size of the unit, having a floor-mounted 90-ft. track, the operator would be hidden from vital working parts of the machine.

Fuselage panels 31 ft. in length are secured to 40-ft. tooling frames and tack rivets are applied every 5-ft. as synchronization points to check precision of the tape-programmed machine.

By himself, the operator was unable to see the rivet ram in relation to the rivet hole from his control station. Either a co-worker or a monitor was needed to observe the ram and the alignment of the work table as a new row of rivets was started.

Douglas engineers found that there was no safe area for a second man to work in. Telautovision, Div. Telautograph Corp., worked with the Douglas engineering department to devise a monitoring system consisting of model 021-101 television cameras and 021-112 monitors.

Cameras project a special crosshair reticle on the 17-in. monitor screen. A circle, .156-in. OD is centered in the reticle and the operator simply bore-sights the tack rivets to synchronize the machine.

The reticle circle is the diameter of the smallest rivet hole to be drilled. If the operator sees the pilot rivet hole anywhere within the circle, the machine is properly aligned.

If it falls outside the circle, the work table can be manually shifted. The monitor magnifies the hole image 2.7 times as an aid to the operator who holds a "dead man" switch for instant stoppage of the riveter in case of malfunction.

Biggest factor in improved operation has been increased operator confidence, according to Douglas engineers. Since the machine can operate at high cyclical speeds, misalignment could prove costly and might send an expensive fuselage panel to the scrap bin. It was felt that once hidden functions of the machine

offered a mental block to high operator performance.

Currently under construction at Telautovision is another type of closed circuit monitoring system due for installation in the West and will automate a railway classification yard. Consisting of a series of model 023-115 cameras and 021,113 monitors, installations will be made in weatherproof buildings some 20 ft. from tracks.

Windows in the camera buildings will have electrically heated glass, window washers and wipers, all remotely controlled from the monitoring point.

As freight cars enter the classification yard, the operator quickly reads the serial number of the car as it passes on the monitor and calls it into a tape recorder for future reference.

If the operator's attention is diverted, a buzzer warns of an approaching car and a visual signal indicates on which monitor it will appear.

For night use, banks of 300 watt and 150 watt bulbs illuminate the track area. Provision has been made for video tape recording of passing cars if no operator is present.

The system will supplant teams of dispatchers making on the spot visual checks of incoming cars and will result in time and labor savings. Severe weather conditions will not hamper the operation.

According to Jack Doze, Telautovision engineer, the installation has potential for remote control of material handling equipment in outdoor storage areas and could be used for traffic control in shipping docks and warehouses.

An additional use of closed circuit television has been proposed as an aid to routine plant security operations, according to Doze. Installation can permit one guard to operate a number of plant gates fitted with electric locks.

Employees could be identified visually and pass through gates opened from a central guard station.

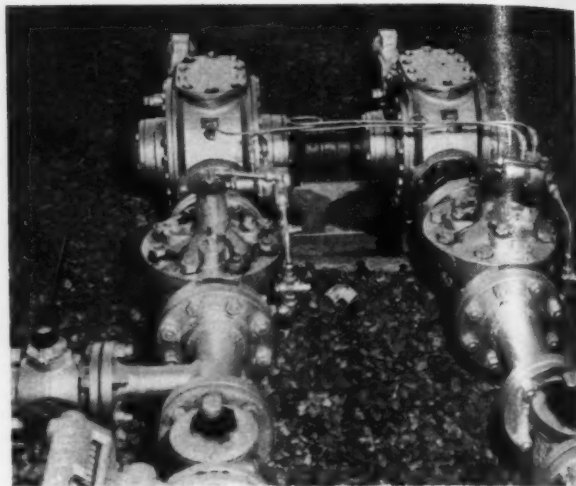


In-pipe proportions of liquids is accomplished inexpensively using pumps that can be accurately adjusted for flow.

BULK HANDLING OF GASOLINE in warm Western climates can be a difficult operation especially when a blending cycle is required to obtain the proper octane product at the delivery rack. In addition to blending considerations, evaporation is present and often complicated by air pollution restrictions governing vapor emission.

These were among problems facing the Continental Oil Co. at their tank farm on the outskirts of Phoenix, Arizona. Storage facilities there include a 40,000 barrel tank of 92 octane regular-grade gasoline and a 30,000 barrel tank of premium product rated at 100 octane.

A third grade of gasoline was needed for the market



TWO BLACKMER VARI-FLO PUMPS, top, feed blend through various strainers and metering devices. Wrench, left, controls bypass that can cut out meter and pipes gasoline directly through a 6-in. pipeline to the delivery rack.

area and required a 96 octane rating. To obtain this grade, conventional blending methods called for direct pumping of equal portions of regular and premium into the tank truck and allowing turbulence during delivery and in-transit to mix the product.

Involved was an extra hookup to the tank truck and additional paper work processing since two deliveries were actually made. If bulk storage of the 96 octane gasoline became necessary, a third tank would have to be built.

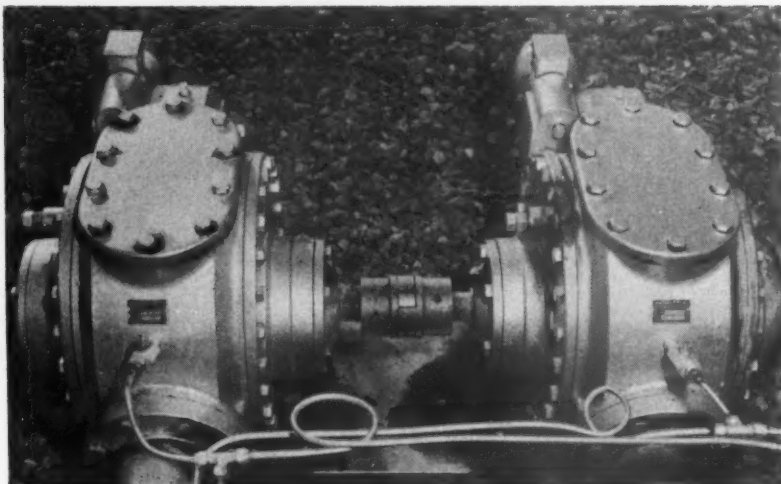
In a pilot program designed to avoid the need for an extra storage tank and to blend the gasoline in the pipe prior to delivery, Continental has installed two Blackmer Vari-Flo pumps that are connected to lines leading from supply pumps at the regular and premium storage tanks.



DELIVERY RACK where gasoline is piped into tank trucks. At far left are meters. Black painted piping is flexible hookup that swings under belly of tank truck during delivery.



→
CLOSE UP of two Blackmer Vari-Flo pumps which are used to blend 92 octane and 100 octane gasolines to produce 96 octane gasoline. Process has eliminated need for erecting an additional tank to store this octane gasoline.



The pumps, actually proportioning devices in this case, float on the line and are without external power. Activation of the Vari-Flo installation is by flow from the supply pumps at about 500 gpm.

When operating, the Vari-Flo units are set at a 50/50 proportion and automatically blend in the pipe equal portions of the regular and premium grade. The 96 octane output is fed to the delivery rack by a 6-in. pipeline.

Evaporation loss and air pollution during blending is greatly reduced and delivery can be accomplished by one hookup to the tank truck and with one set of entries on the bill of lading. Adjustment of the blend proportions can be made by calibrating controls on

each Vari-Flo pump.

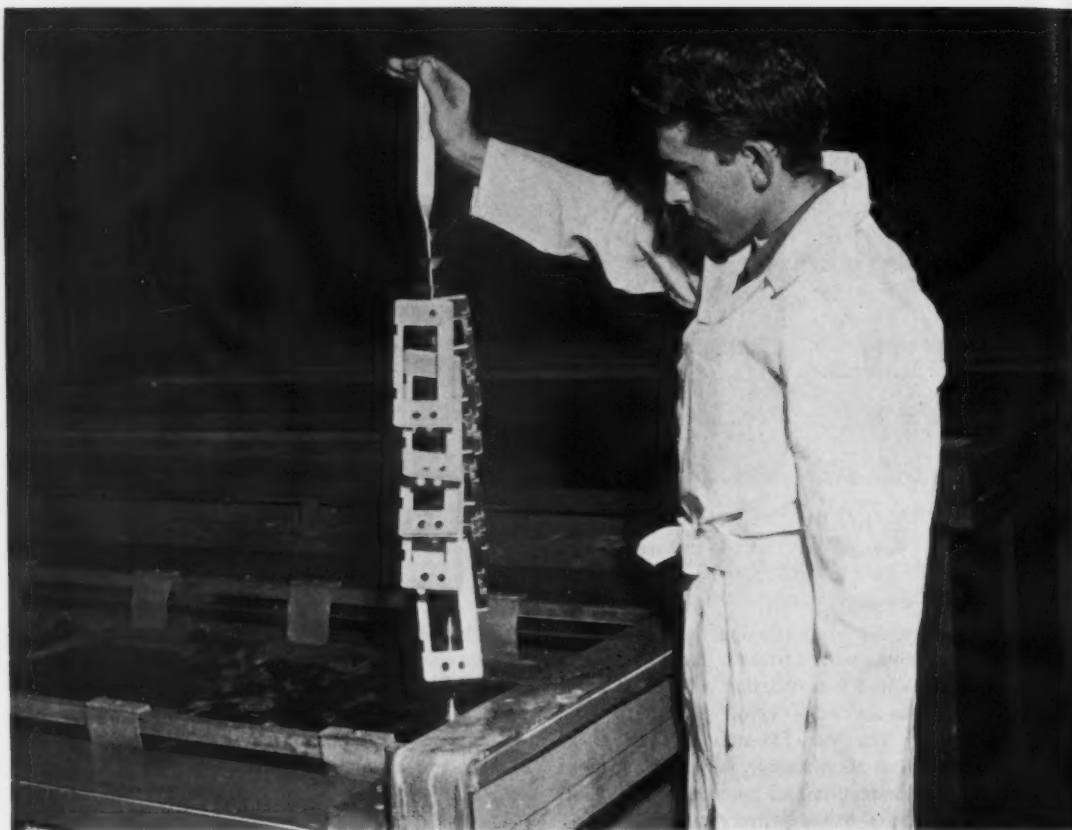
Two sets of meters check on quantities delivered. A meter placed on line after the Vari-Flo pump can be proved through use of a by-pass that feeds the blend directly to meters at the delivery rack.

These meters are a master and a compensating system. The compensator allows for temperature factors that affect delivery by evaporation and expansion. The meter houses an imprinter that indicates the amount of delivery on a multi-carbon bill-of-lading.

The Vari-Flo pump is applicable to proportioning a wide range of low viscosity liquids. It has been used to blend asphaltic compounds, lubrication and fuel oils, thinners, solvents, waxes and chemicals.

→
ADJUSTMENT OF METERS prior to delivery of 96 octane blend is made by Ken Giaque, tank farm operator. Bottom unit is a compensating meter that makes adjustment for temperature and resultant expansion-evaporation factors during delivery.





RACKING OF PARTS is vitally important, as each item must be properly spaced before immersion to insure against burring or arcing during anodizing and to prevent rack marks in the black anodized coating. Parts are racked in areas not accessible to cathode ray penetration.

ANODIZED ALUMINUM finds increased usage

Process versatility has been further increased by optical black treatment. Parts have uniform hue and are fade resistant but treatment requires careful control.

ANODIZED ALUMINUM is being used in increasing quantities by the Western instrumentation industry because of its light weight, surface toughness and workability.

Extending the application of this specially treated metal is Anadite Inc., South Gate, Calif. anodizing and chemical milling firm that has developed an optical black anodizing process for parts used in recording oscillographs manufactured by Consolidated Electrodynamics Corp., Pasadena, Calif.

Parts treated with the optical black process insure that oscillographs can receive complete ultra-violet light protection and that possibility of faulty readings because of infiltrating light are eliminated.

The process calls for use of a specially compounded black dye, a careful sealing of surfaces and white glove care during packaging to prevent scratches. Anodized surfaces, however, are tough enough to resist reasonable assembly line wear and tear.

Anodizing was selected over methods such as painting surfaces because of fade resistance and its ability to produce a more uniform black hue.

Parts made from seven aluminum alloys were pre-cleaned and had surface blemishes removed by abrasive polishing before leaving Consolidated Electrodynamics. They were wrapped in protective packaging and shipped to Anadite.

Since each of the alloys reacted differently to the



1. Performs like a regular fork lift truck . . .



2. Stacks left 90° in narrow 6' aisles . . .



3. Stacks right 90° in same narrow aisles . . .



4. Drives loads into trailers and boxcars!

One truck . . . one operator . . . does all this!

(Only the new Towmotor "Naro-Aisle-Stack" Truck can!)

- Only truck of its kind for narrow 6-foot aisle stacking
- One lift truck does the work 3 trucks usually do
- Makes 36.5% of "lost" space usable in average plant

Amazing performance? You can't imagine what the "Naro-Aisle-Stack" lift truck will do until you actually see it . . .

See how it pivots loads a full 180° because it's equipped with hydraulic outriggers. See how it stacks materials left or right 90° and picks up loads from the same extreme angle. See how it also performs all other functions of regular fork lift trucks.

Most spectacular of all is the way it performs within the confines of narrow, six-foot aisles—enabling you to utilize storage space you considered "lost"!

Such unique operation is made possible only because "Naro-Aisle-Stack" trucks are equipped with Towmotor Towmostatic Drive—the only drive of its kind that eliminates clutch, transmission, drive line, differential and shifting mechanism.

Ask for booklet, "Captures Lost Space," describing the new series. Write Towmotor Corporation, Cleveland 10, Ohio.



New Naro-Aisle-Stack Trucks made only by . . .



Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation
 . . . for more details, circle No. 23 on Reader Service Postcard



PARTS with carefully machined ID's are protected from anodic solutions by use of special rubber corks.

same anodizing process, solutions and procedures were jockeyed to make finishes as compatible as possible. A series of 200 sample aluminum chips were produced during preliminary stages of the project to perfect the finish and to satisfy quality control specifications.

Treatment of the metal produced approximately 5 billion pores per sq. in. of anodic surface for dye to penetrate. Since it was necessary to have dense black dye absorption over the critical areas of the part, racking operations were closely watched.

Rack marks would produce surface highlights that would give an erroneous reading on the instrument. For this reason parts were attached to racks in areas that were inaccessible to cathode ray penetration.

After dye penetration through the .0006-in., or less, anodized surface, a nickel-acetate sealant was applied to maintain the color against fading.

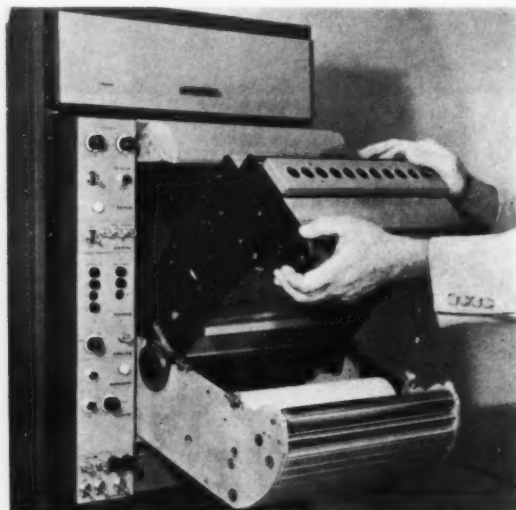
Care was exercised not to overseal parts as this creates a surface smut and its removal by wiping would bring up a surface gloss that would affect the uniformity of light refraction.

Prior to packaging for shipment, parts were submitted to thorough inspection by a gloss meter to record intensity of light refraction.

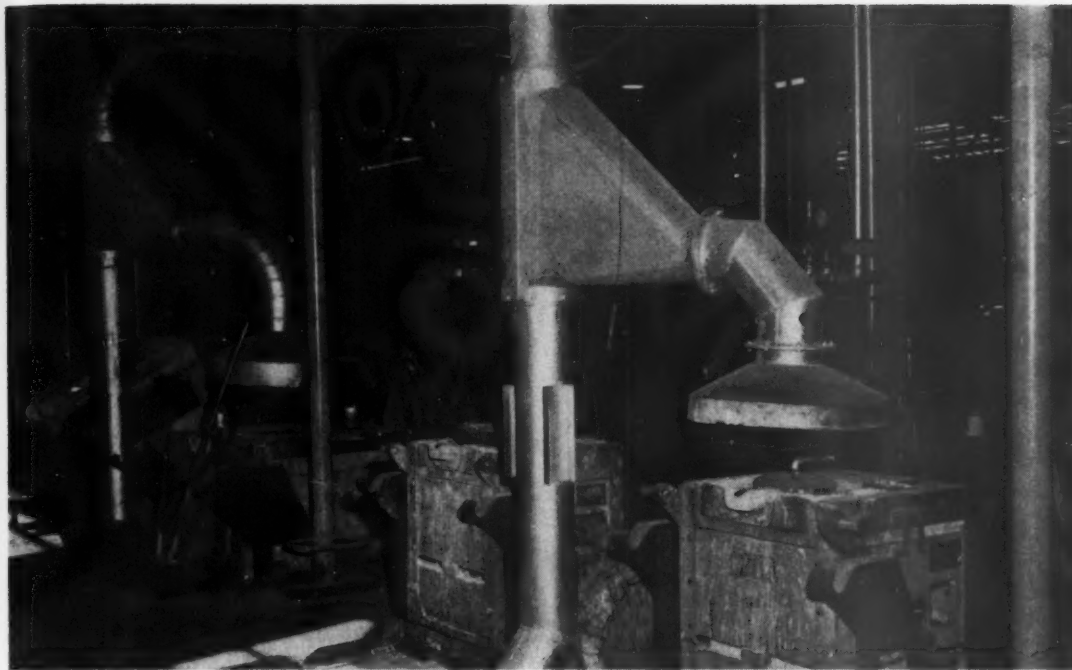
Quality control was established on the processing line and at packaging stations where treated parts were packed individually in Kimpak Super Crepe packaging material made by Kimberly Clark Corp.



BLACK ANODIZED optical nodule is given final check at Consolidated Electrodynamics plant. Anodized surfaces provide complete protection against ultra-violet light penetration.



TO PROTECT anodized surface from scratches that would cause error in the unit, parts are individually wrapped in Kimpak Super Crepe packaging material made by Kimberly-Clark.



COMPLETE BATTERY OF FURNACES varying in capacity, from left, 2000 lbs., 1000 lbs., 300 lbs., and 100 lbs. are serviced with two hoods that each cover two furnaces by swiveling left or right. Hoods trap fumes, heat, particulate matter in conformance with air pollution control codes.

QUALITY CONTROL of furnaces

Handy standby units are key to this foundry's operations. They cut delays from metal contamination and lining failure and keep quality high.

OUTRIGHT FAILURE AND METAL CONTAMINATION of refractory linings are universal foundry problems that delay production and limits the variety of alloys that can be processed during a scheduled period.

After discovery of lining failure the furnace often becomes a non-productive item during a lengthy cool down period and until ramming of a replacement lining. Because of metal contamination many Western stainless foundries, for example, can melt only the 300 series alloys at a given time.

If a customer needs a 400 series heat he must wait until scheduling allows its production since refractory linings pick up nickel from the 300 series alloys and if linings were reused they would contaminate the new heat.

To avoid problems of downtime due to lining failure and scheduling difficulties posed by processing of a wide variety of alloys, Centrifugal Castings Co., Long Beach, Calif., has installed a versatile four station high frequency Ajax induction furnace complex powered by dual 175 kw horizontal Westinghouse motor generators.

Key to versatility of this setup is an extra furnace for each of the four melting stations. These are kept on a standby basis. If a refractory lining fails, the furnace is quickly freed of electrical connections, is shunted aside and a fresh furnace moved in its place. Power cables are reconnected and the furnace is ready for charging.

Any furnace can be replaced in 30 minutes. This allows melting to continue after negligible down time.

→

QUICK DISCONNECT SYSTEM consists of threaded couplings that attach power cables to male fittings on terminals leading to induction coil. Cables can be pulled, the old furnace removed and a new one installed in 30 minutes.

If a heat that has just been poured poses a contamination problem for the next alloy, a standby furnace is quickly moved in. In this manner a wide variety of alloys can be scheduled in a limited period or during the same shift if necessary.

Included in the battery of furnaces are units rated at 1500 lbs. capacity, 650 lbs., 300 lbs., and 100 lbs. The two larger furnaces have a maximum 2000 lb. and 1000 lb. capacity.

When the largest furnace is used the Westinghouse generators are run in parallel and may be run separately to power any two of the remaining three furnaces. The concept of furnishing power to these induction units from horizontal motor generators through a quick disconnect electrical system was worked out jointly by Inductotherm Corp. and Centrifugal Casting Co.

A further aid in speeding production of metal, especially certified alloys for remelt, is a newly installed Baird-Atomic Spectromet, an electronic spectrographic analysis unit.

With this machine an arc is drawn on a small sample button of metal poured from a heat. Arc light is directed through a prism that diffuses light into a spectrum that is measured for intensity by a series of photoelectric tubes. These in turn activate dials that record an accurate analysis of nine chemical elements.

Preparation of the metal sampling for the test and the analysis itself can be accomplished in a matter of minutes and in less time than in the conventional "wet" laboratory that Centrifugal maintains to make analysis of elements not covered by the Spectromet.

It is standard practice for the laboratory to take a preliminary sample before the heat is poured and in some instances heats have been saved on the spot when analysis showed that addition of alloys could bring the heat into specification.

→

STANDBY AJAX SHELL with freshly rammed refractory lining awaits in storage bay adjacent to melting line. If furnace fails during melting operation or a contamination problem arises, fresh unit minimizes downtime.





WHAT'S DIFFERENT ABOUT J&L PRECISION STRIP STEEL ?

The big difference in J&L strip steel is controlled uniformity.

When J&L Precision strip is ordered to exacting specifications, you can be sure that your specifications will be met . . . inch after inch, coil after coil, time after time.

The dimensional accuracy of J&L strip steel, consistently maintained, offers many cost-saving advantages. This means fewer rejects; fewer production problems; less down-time for tool adjustment. This means that you are getting the steel you pay for . . . in terms of maximum product yield per ton.

How?

By delivering the steel you order . . . to your specifications . . . J&L helps you to achieve optimum production with control of in-plant fabricating costs.

J&L's Los Angeles Plant maintains one of the largest stocks in the West of stainless steel sheet, strip, bar, wire and plate; aircraft quality alloys; spring steel; coated steels; precision cold rolled strip steels; aluminum, brass and copper.

FOR SERVICE CALL: Los Angeles: RAYmond 3-4581 • San Francisco: DOuglas 2-1794 • San Diego: CYpress 5-2161 • Seattle: EMerson 4-1040 • Phoenix: AMherst 5-5490 • Salt Lake City: CRestwood 7-3810.



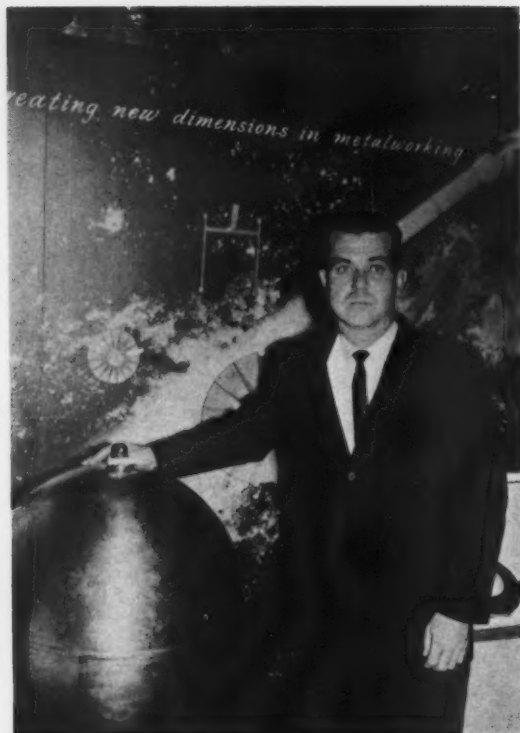
LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
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LOS ANGELES PLANT

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WITH HAND ON TOP of helium storage bottle made by Arcturus from forged Titanium is Wes Leonard, sales representative. Arcturus also displayed complex turbine components made from forgings rather than by conventional machining operations.



AUDIO VISUAL ASSEMBLY AID produced by Nortronics Div. Northrop Corp. was in action with assembler producing complex parts by listening to instructions through earphones and checking assembly steps by comparison with color slides projected from screen, left.

SAE—AIR FORCE combined meeting

In Los Angeles 4000 engineers attended this important technical event. Here is what happened.

LOS ANGELES was the site last month of a double barreled meeting featuring simultaneous presentations of both the Society of Automotive Engineers, Aeronautic section, and the third Air Force Office of Scientific Research Aeronautic symposium at the Ambassador Hotel.

More than 4000 engineers, scientific personnel and executives attended 34 technical sessions and heard over 90 papers during the combined conference. Some 75 companies sponsored exhibits covering materials, processes and manufacturing tools.

Basic purpose of combining the AFOSR symposium with the SAE effort was to provide project personnel with a chance to exchange information with one another and to acquaint design and production engineers with the type of space hardware that they may be called upon to produce.



VISITORS TO KOPPERS CO., INC. booth were shown high temperature and high speed shaft seals made by Koppers from stainless and other specialty steels. B. J. Sadoff, right, described seals for liquid and gas applications.

Highlight of the annual event is presentation of the Wright Brothers Award, going this year to Milford C. Childers, Lockheed, for his paper on preliminary considerations of a tri-sonic transport aircraft.

The paper discussed structural design, aerodynamic heating, high altitude operations and possible use of refractory metals such as tantalum alloy to produce fuselage components.

Turning to development of nuclear rocket engines, Dr. L. R. Sitney, supervisor of advanced nuclear systems, Rocketdyne, forecasted that nuclear rocket engines may be test flown first from remote areas in the Pacific but that no technical barriers exist to prevent future landings at missile test sites in the continental U. S.

Sitney said that nuclear flights would pose no significant radiation problem and that as many as 10,000 tests could be conducted yearly without increasing strontium and cesium radio-activity levels.

High cost of designing jet airplanes to make them acceptable to residents of airport areas from a noise point of view was discussed by W. R. Walley, Douglas Aircraft, who set a \$93,000 yearly price tag on efforts of any airline to suppress the sound of a single multi-jet transport.

Over an expected life span of 10 years for the plane, Walley estimated that suppression activities would cost about 17% of the total purchase price of the ship. R. N. Gardner was co-author of the paper.

Walley concluded that a whopping \$370 million dollars would have to be spent by the air-transport industry over a ten year period just to "domesticate" the jet.



MECHANICAL RUBBER GOODS ranging from ducting being held by John Repar to seals used in containing fluids in valves and flow control devices were on display by Stillman Rubber Co.



COLUMBIUM IN FOIL FORM along with other refractory metals such as Tantalum were shown by Union Carbide Metals Co. Holding sample Columbium sheet is F. E. Loeffler, manager of sales promotion.



PARTICLE SIZE AND SIZE DISTRIBUTION of batch products such as wood pulp, cement, minerals, metal powders, abrasives, and air pollutants was demonstrated by Shepard Kinsman, Coulter Industrial Sales Co. Kinsman adjusts counting unit that is analyzing particle size of liquid sample.



HELPFUL LITERATURE

FOR THE WEST'S PLANT OPERATING EXECUTIVES

FOR YOUR FREE COPY CIRCLE APPROPRIATE KEY NUMBERS ON POSTCARD, P. 91

SQUEEZE ACTION VALVE

A new valve that represents a different concept in valve design and operating characteristics is described in this bulletin. Discusses unique squeeze action that automatically controls the flow of air, oil, chemicals and grinding slurries. Covers operation, media, pressures, sizes and construction. *Airmatic Valve Inc.*

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NEW HYDROGEN PROCESS

How hydrogen gas can be produced at low cost from commercial anhydrous ammonia by using a newly developed absorption process is discussed in this bulletin. Includes pictures of the compact plant and flow diagram; discusses advantages of the plants and lists the cost of hydrogen produced in the compact plants. *The Electric Furnace Co.*

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MULTI-STAGE PUMPS

A new line of multi-stage, opposed-impeller, centrifugal pumps to handle hot or cold water, hydrocarbons, chemicals, acids, condensates and similar liquids is described in this bulletin. Also discusses adaptation for medium-pressure boiler feed service and how, with minor modifications, they become efficient hydraulic driving devices. *Pacific Pumps, Inc.*

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POSITIVE DRIVE BELTS

A 60-page booklet devoted to the positive drive concept in power transmission. Explains terminology, construction of the positive drive belt, and advantages of its use. Includes technical data on pulleys, belt stock pitches, selection recommendations, horsepower ratings, stock positive drive selections and installation pointers. *Durkee-Atwood Co.*

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AIR TOOLS

Complete line of air tools, power motors and accessories is included in this 96-page catalog. Groups contents in nine sections with edge markers on all pages for easy reference. Contains specifications, line drawings and technical data. *Aro Equipment Corp.*

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MASS SPECTROMETER

Bulletin opens with a general description of a mass spectrometer. Gives full information on a gas source model, a spark source model and other ion sources and detectors. Discusses under applications its flexibility, making it useful as a standard analytical tool for laboratories conducting advanced-materials research. *Consolidated Electrodynamics Corp.*

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SELF-LOCKING NUTS

An up-dated review of complete line of self-locking standard nuts and clinch nuts. Includes complete specification information for both light and heavy duty thin and full height lock-nuts; for the microsize series; for the 8-pitch series; and for both standard and microsize clinch nuts. Covers application information. *Standard Pressed Steel Co.*

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MOLY PERMALLOY

A technical discussion, booklet gives detailed background on this special alloy for use in the electronic industry. Includes information on testing data, hysteresis loops, special heat treating data, magnetization curves, core loss graphs, typical physical, mechanical and magnetic properties. *Allegheny Ludlum Steel Corp.*

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INDUSTRIAL PLASTICS DATA

A 216-page plastics catalog with technical information for machining, forming and processing plastics such as Teflon, Kel-F, Nylon, Styrene, epoxies and Permalin laminates. Specific data on dielectric insulation, tensile strengths, hardness, deformation, moisture and water resistance, linear expansion and contraction characteristics is given. *R. S. Hughes Co., Inc.*

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COMPUTER APPLICATIONS

Bulletin describes how a digital computer is demonstrating its versatility at two plants of a small refinery. Applications described include computation of material balances; forecasting alkylation, polymerization, and outside butane requirements; analysis of heat-exchanger performance and gasoline blending. *Bendix Computer Div.*

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HIGH TEMPERATURE TUBING

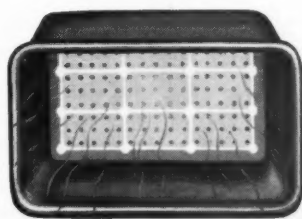
Information on 15 steels widely used in pipe and tubing for high temperature service is contained in this bulletin. Included is a chart containing data on tensile properties, thermal conductivity and expansion, creep strength, oxidation resistance and other mechanical and physical properties of importance to application engineers. *Babcock & Wilcox Co.*

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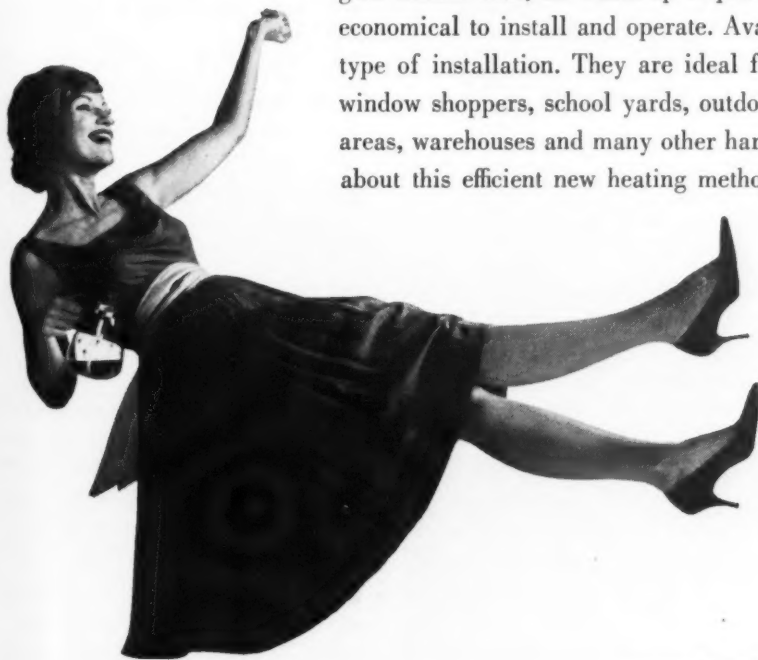
New way
to warm people

in
"outer
space"



New radiant gas heat is the answer to keeping people warm and comfortable outdoors or indoors. Like the sun, these heaters generate invisible infra-red rays. They warm objects, not air . . .

give instant heat, no warm-up required. These units are small, economical to install and operate. Available in many models for any type of installation. They are ideal for hotel and motel patios, window shoppers, school yards, outdoor restaurants, swimming pool areas, warehouses and many other hard-to-heat places. Ask PG&E about this efficient new heating method or see a heating man soon.



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Pacific Gas and Electric Company

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"The herring-bone gears in the drive unit of our 6-stand, 10-inch mill that rolls our high speed tool steels became noisy. Inspection showed definite signs of flaking of gears. This was in 1939. It was then we started to use LUBRIPLATE in them and we have not encountered any flaking trouble since."

L. M. Potter
Purchasing Agent

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.



For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



... for more details, circle No. 26

LITERATURE ADVERTISED IN THIS ISSUE

Welding Data on electrodes and welding wire. *Air Reduction Pacific Co.*
Page 13 Circle No. 10

Liner Plates for supporting tunnels. *Armco Drainage & Metal Products.*
Page 69 Circle No. 37

Chain Catalog has 100 pages with data section. *Acme Chain Corp.*
Page 8 Circle No. 5

Pumps for all jobs whatever the requirements. *John Bean Div., FM&C.*
Page 58 Circle No. 29

Chain Assemblies easily made with special coupling link. *Columbus McKinnon Chain Corp.*
Page 96 Circle No. 59

Cost Cutting data on automatic handling installations. *Cleveland Tram-rail Div.*
Page 22 Circle No. 16

Specialty Strip steels from a Western mill source. *Calstrip Steel Corp.*
Page 76 Circle No. 48

Cranes that are engineered for the job. *Harnischfeger Corp.*
Page 11 Circle No. 10

"Design for Brazing" is 24-page illustrated booklet by *Fabirform Metal Brazing Div.*
Page 93 Circle No. 56

Motor Reducers of all steel construction for extra rigidity. *Falk Corp.*
Page 31 Circle No. 20

Data Book, that gives valuable information on lubrication. *Lubriplate Div.*
Page 54 Circle No. 26

Ventilator that exhausts in summer, recirculates in winter. *Genie-Air Products.*
Page 65 Circle No. 35

Universal Joints and tumbler shaft assemblies from factory stock. *Grether & Grether.*
Page 10 Circle No. 8

Job-Designed Fasteners reduce assembly costs. *John Hassall, Inc.*
Page 73 Circle No. 44

Industrial Materials Handling the Payloader way. *Frank G. Hough Co.*
Page 101 Circle No. 63

How to clean exhaust fumes with fume scrubbers. *Heil Process Equipment Corp.*
Page 81 Circle No. 52

Catalog illustrates diversified line of steel equipment. *Lyon Metal Products.*
Page 26 Circle No. 19

Correct Lubrication at reduced costs through a program. *Mobil Oil Co.*
Pages 6 and 7 Circle No. 4

Literature and Sample on how Thermomelt Stik can determine exact working temperatures. *Markal Co.*
Page 59 Circle No. 30

Floor Trucks, casters, wheels, many varieties, fast delivery. *Nutting Truck and Caster Co.*
Page 79 Circle No. 50

Air Controls, quick disconnects. Bulletin shows complete line. *Perfecting Service Co.*
Page 70 Circle No. 39

Non-Clog Pumps, Condensate and boiler feed units. *Pacific Pumping Co.*
Page 99 Circle No. 62

Pocketed Chain Sheaves and chain guides for light or heavy duty use. *David Round & Son, Inc.*
Page 105 Circle No. 65

Steam Traps have thermostatic element, balance pressure. *Sarco Co., Inc.*
Page 82 Circle No. 53

Wrenches and hand tools. Complete catalog lists full range. *Snap-On Tools.*
Page 80 Circle No. 51

Lift Truck stacks in narrow 6-ft. aisles. Booklet, "Captures Lost Space" describes operation. *Towmotor-Gerlinger.*
Page 45 Circle No. 23

Metal Hose catalog shows expanded line. *Universal Metal Hose Co.*
Page 72 Circle No. 42

Pumps specially designed to handle abrasive liquids. *Viking Pump Co.*
Page 105 Circle No. 66

Lift Truck finance plan puts truck to work for you immediately. *Yale & Towne, Yale Materials Handling Div.*
Pages 14 and 15 Circle No. 11

V-Belt Drives, bulletin covers new line. *Dodge Mfg. Corp.*
Page 63 Circle No. 34

Belting, facts on how to save money with Dixylon. *R. & J. Dick Co., Inc.*
Page 72 Circle No. 41

Wire Rope Hoists for safe handling of intricate assemblies. *Harnischfeger.*
Page 12 Circle No. 9

VERSATILE FREIGHT PRY

How a freight pry, primarily designed for moving objects, can also be used as a spike and nail puller is explained in this bulletin. Describes the extra utility which is particularly useful in removing freight blocking from railroad cars and trucks. *Nutting Truck and Caster Co.*

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MAGNETIC MOTOR STARTERS

A new concept in motor control design through 30 hp 550V, offering unitized construction with all components front removable, is the subject of this bulletin. Discusses application of the new sizes 2 and 2½ magnetic starters, features of the design and technical data. *Furnas Electric Co.*

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PLASTIC ROOF VENTILATORS

Engineering data about solid plastic roof ventilators for removing corrosive fumes for labs, plating rooms, pickling houses, chemical plants, paper mills, fume hoods, anodizing and refining. Outlines advantages of the ventilators, features, specifications and a drawing of top and side view. *Heil Process Equipment Corp.*

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INSULATING FILL

A low-density insulating fill for use with low temperature liquified gases is the subject of this brochure. Describes the safety and effectiveness of the lightweight powder, and lists its conductivity and physical properties. A chart demonstrates graphically the insulation effect per dollar obtained through use of materials for cryogenic applications. *Johns-Manville Corp.*

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OXYGEN CUTTING OF BEVELS

Specific problems associated with oxygen cutting of bevels is a reprint of a paper delivered before the American Welding Society in Los Angeles. Complete with graphs and illustrations, the article covers the relationship of pre-heat, cutting oxygen and speed in bevel cutting, practical techniques, and a comparison of common fuel gases in bevel cutting. *Air Reduction Pacific Co., Div. Air Reduction Co., Inc.*

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CENTRIFUGALLY CAST
stainless steel
TUBING

The Greatest Selection of Sizes and Alloys on the West Coast!

You can now take full advantage of the superior qualities of Centrifugally Cast Stainless Steel tubing and cylinders in the design of your products. In addition to greater strength, superior density and cleaner metal, centrifugally cast tubing offers a complete selection of alloys. Sizes range up to 20" o.d. in lengths up to 6'-0". All this adds up to the improvement of your product in quality with fewer rejects in machining... PLUS the added benefit of economy in many operations.

Quality Controlled in Modern Plant...

You are sure of dependable delivery of superior castings time after time with quality rigidly controlled in Centrifugal's modern plant.

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CENTRIFUGAL
CASTING COMPANY

3245 Cherry Avenue, Long Beach 7, California

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POWER-FLOW TRANSMISSION

Booklet describes a newly developed constant speed drive or automatic transmission for small engines in the 1 to 25 hp category. Discusses the versatile and compact features of the power flow, transmission, and covers application, principle of operation, drive selection, installation and maintenance. *Morse Chain Co.*

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ROLLER-CHAIN SPROCKET GUIDE

Booklet catalogs an expanded roller-chain drive line. Covers B and C sprockets, style A plate sprockets; quick-demountable sprockets and bushings; and roller chain. Includes detailed instructions on drive selection, sprocket mounting instructions and lubrication recommendations. *Fort Worth Steel & Machinery Co.*

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CORROSION COMPUTER

This 4 x 8 in. card works like a slide rule and tells in seconds how each of eight types of metal withstands the corrosive effects of 141 chemical agents. The metals are brass, naval bronze; silicon bronze; monel metal; stainless types 410, 416 and 430; stainless types 302, 303, 304 and 305; stainless type 316; copper and aluminum. *H. M. Harper Co.*

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ALL-METAL FLEXIBLE HOSE

Catalog pictorially describes an all-metal flexible hose conveying gases, solids and fluids; for vibration control; and to compensate for motion or misalignment under high temperature, pressure, vacuum or abrasive conditions. Includes detailed descriptions, specifications, and applications-use together with coupling recommendations. *Universal Metal Hose Co.*

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DIGITAL VOLTMETERS

Pocket guide to the proper selection of digital measuring instruments covers factors to be considered in selection. The guide outlines practical applications of digital measuring instruments and discusses the servicing factor in selecting a digital voltmeter. Also covers features and applications of instruments. *Non-Linear Systems, Inc.*

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MASS-HANDLING METHODS

An illustrated job study shows how a fleet of fork lift trucks speed storage operations and simplify inventories in a truck dock facility. The brochure poses the problem and outlines what was done to utilize the new shipping facilities combined with mass-handling methods to reduce loading time by 80 per cent. *Towmotor Corp.*

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ADJUSTABLE STORAGE RACKS

The unique design of this brochure emphasizes the simplicity of the two-part upright frame and shelf beam assembly feature of the rack described in the literature. Includes illustrations of rack versatility in an almost infinite combination of storage heights and depths, and in single, double and multiple openings. *Palmer-Shile Co.*

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FLOW METERS

Flow meters using the vortex-velocity principle for measuring liquids and gases are the subject of this literature. Discusses industrial uses, operating principle, design features, application and combining the meter with a densitometer or a variety of electronic instruments to measure mass flow. *Minneapolis-Honeywell Regulator Co., Industrial Div.*

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SILICON BATTERY CHARGERS

Bulletin covers complete line of chargers for six and nine cell industrial truck batteries. Details the nature of the constant potential, automatically regulated circuit that makes the line of chargers so effective; shows charging characteristics; and gives complete electrical and mechanical details. *C & D Batteries, Div. Electric Autolite Co.*

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INSTRUMENT SUMMARY

A 20-page brochure contains basic specifications on pressure transducers, position instruments, accelerometers and instrument systems. General information is included giving typical applications, features and operating principles. Specifications cover range, resistance, resolution, error bands, linearity, hysteresis, size and weight. *Bourns, Inc., Instrument Div.*

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UNIVERSAL-TYPE SPIRAL SPACER

Brochure describes a universal-type spiral spacer for use when joining crushable panels to other parts or panels. Outlines many potential uses for the new spacer and illustrates a variety of typical applications with cross-section line drawings. Explains installation by unskilled operators with two simple hand tools. *Huck Mfg. Co.*

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FLEXIBLE CUSHION COUPLINGS

Two new types of flexible cushion couplings, one for high speed, high torque applications and another for attachment to flywheels of internal combustion engines, are described in this 20-page bulletin. Includes complete engineering data, photos, dimension drawings and selection tables. *Dodge Mfg. Corp.*

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SEAMLESS WELDING FITTINGS

Booklet is devoted to seamless welding fittings and flanges in carbon, alloy and stainless steels. Includes charts of standard sizes and schedules according to ASA B36-10 and ASA B36.19. Also contains a comprehensive breakdown of dimensional tolerances and illustrations of the most commonly produced fittings and flanges. *Babcock & Wilcox Co.*

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REDUCED VOLTAGE STARTERS

Publication describes full line of reduced-voltage starters, their uses and contains a selection and comparison table covering the various types of starters. Also discusses the operation and application of manual and magnetic autotransformer starters, part winding, primary resistor and firm's new wye delta starters. Diagrams typical wirings. *General Electric Co.*

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MODERN THICKNESS TESTING

Informative description of the various non-destructive methods currently employed for measuring the thicknesses of organic and non-magnetic metal coatings on iron and steel. The advantages and limitations of each method are thoroughly discussed in light of thickness measuring instruments now available. *Twin City Testing Corp.*

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NOW...

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LAMINATED PLASTIC MOLDS

Molded products for a wide range of industrial applications are described in this booklet which includes design of the part, design and fabrication of the mold, and molding of the part. Lists properties of 25 laminates available in molding grades. Photos show typical applications. *Formica Corp.*

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POWER TRANSMISSION

Illustrated bulletin covers a full line of equipment for practically any power transmission equipment. Features flexible couplings, variable speed pulleys, belts and sheaves, motor bases, variable speed transmissions, shaft mounted gear reducers and universal joints. *Lovejoy Flexible Coupling Co.*

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SYNTHETIC WEB BELT SLINGS

Brochure is devoted to a new line of safety-weave synthetic web belt slings. Contains useful information about both nylon and dacron slings including data showing the resistance to all common agents. Charts list dimensions and capacities of synthetic slings in vertical, choker and basket applications and available aluminum and steel fittings. *Jones & Laughlin Steel Corp.*

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GAMMA RADIOGRAPHY

The background, applications, advantages, safety and definitions pertaining to gamma radiography are explained in this booklet. Discusses nuclear system services, general equipment, selection of sources and equipment for gamma radiography, methods of exposure, typical radiographs and what they show and describes available equipment. *Nuclear Systems Div., The Budd Co.*

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WIRE CONSTRUCTION DESIGN

Manual features case histories of how design engineers were able to cut costs and improve the quality of their products through the use of wire and strip metal components. Describes principal types of wire for component construction, finishes, wire sizes and the variety of end treatments, threading and forming treatments possible. *E. H. Titchener & Co.*

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PORTABLE SWAGE PRESS

A portable press with 165 ton jaw pressure for swaging sleeves and fittings on wire rope in sizes up to one-half inch is the subject of this brochure. Discusses features of the new press, design, operation and optional power source. Includes specifications and illustrations. *Esco Corp.*

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PUMP DATA FOR ENGINEERS

Bulletin prepared specifically for engineers and engineering companies requiring data on building pumps into systems. Discusses operation, selection, application data and frames including dimensions, performance and port sizes. Also covers food pumps and accessories. *Fernholtz Machinery Co.*

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RAPID ASSEMBLY SHELVING

Metal shelving that features simplicity, strength and clean design is described in this brochure. Explains the patented all-purpose key which locks shelves and end panels securely in position while supporting heavy loads. Describes 15 parts for rapid assembly; discusses basic shelving types and lists measurements. *W. R. Ames Co.*

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FIRE PROTECTION PIPE

The advantages of an asbestos-cement pipe for fire protection systems in industrial plants are described and illustrated in this brochure. Details performance properties and illustrates a typical arrangement of a plant fire protection system from tank or well to connections to building supply and hydrants, including correct location of fittings and outlets. *Johns-Manville Corp.*

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INTERFLOOR BELT CONVEYORS

Photographs and sketches illustrate typical installations of permanent, inclined belt conveyors for efficient interfloor handling of goods and material and for use of this type of conveyor for greater utilization of mezzanine and balcony space. Also includes specifications for general and heavy duty permanent inclined belt conveyors in standard lengths, widths, bed types and belt speeds. *Rapids-Standard Co., Inc.*

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BRONZE BALL VALVE

A new ball valve is described and detailed in this literature. Bulletin outlines the operation of the valve, shows cutaway views, ratings and describes specific design features and dimensions. Bulletin also reports on applications and advantages of the valve. *Lunkenheimer Co.*

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HIGH-STACKING WALKIE

A 2,000 pound capacity walkie with a built-in charger that works on any 115 volt AC outlet to recharge overnight is described and illustrated in this bulletin. Lists many outstanding features of the walkie for transporting, stacking, loading and unloading in plants and warehouses. *Lewis-Shepard Products, Inc.*

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SCREWDRIVING AND NUTSETTING

This portable air tools book is a complete tool-selection manual concentrating on torque ranges from 2 in. pounds to 160 in. pounds. Catalog is based on three factors for selecting the proper tool: basic motor size and speed, proper clutch, and style of handle. *Master Power Corp., Sub. Black & Decker.*

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FLAME HARDENING EQUIPMENT

Clearly illustrated and diagrammed, this brochure discusses the various problems of oxyacetylene flame hardening and shows how these problems can be solved. All available equipment for the process is discussed from standard heating torches and tips and water-cooled flame hardening torches to gear hardening equipment. *Air Reduction Pacific Co., Div. Air Reduction Co., Inc.*

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DIFFUSION COATINGS

Booklet reports on a newly developed process for diffusion coating which is undergoing extensive field testing. Describes advantages of the new process in giving parts a surface layer with exceptional oxidation resistance. Lists mechanical properties of the coatings and also many of the common engineering metals and alloys that can be protected. *Haynes Stellite Co., Div. Union Carbide Corp.*

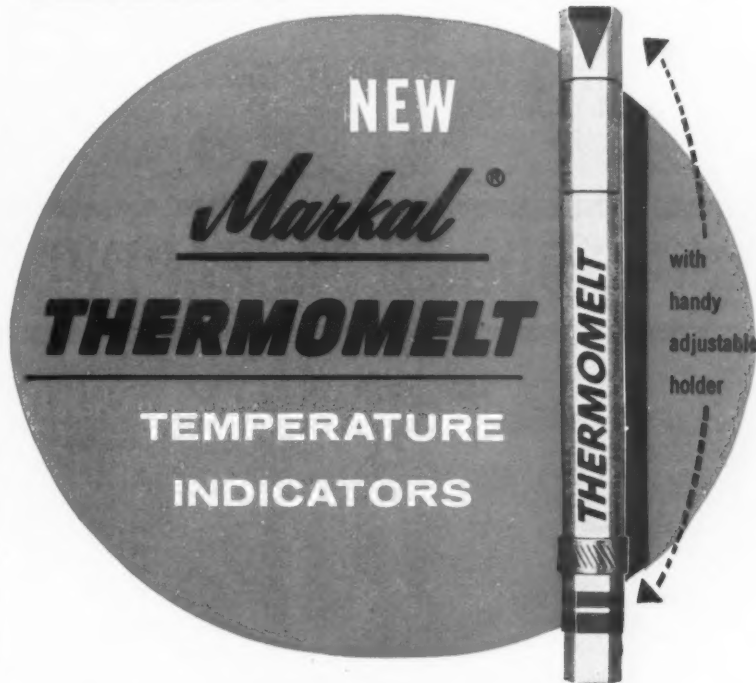
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GRAPHITE ELECTRODE PROPERTIES

Folder of data sheets contains important information about graphite electrode properties. Data covers typical chemical and physical properties of graphite electrodes in various grades and sizes. *Electrode Div., Great Lakes Carbon Corp.*

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NEW AIR FILTER DESIGN

A different design in compressed air filters developed around three major features of efficient filtration, low pressure drop, and large bowl capacity, is the subject of this bulletin. Includes specifications, model descriptions and operation. *Wilkerson Corp.*

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INDUSTRIAL LUBRICANTS

Sixteen page booklet outlines industrial oils and greases and lists recommended uses. Included are mill, shafting and journal oils, steam cylinder oils, turbine oils, cutting and hydraulic hoist oils, waterproof greases and many others. *Tidewater Oil Co.*

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YARD SERVICE LIFT TRUCK

A new model lift truck, especially designed to deliver high performance in all-around yard service, is described in this brochure. Photos and diagrammatic sketches show details of outstanding mechanical features. Includes application photos. *Champ Corp.*

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SURFACE GRINDER HAND FEED

A newly developed manual-control surface grinder for either wet or dry grinding is the subject of this brochure. Discusses design features, construction, and specifications. Magnetic chucks and other accessories are also described. *King Machine & Mfg.*

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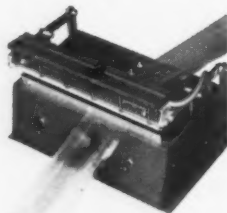
MOLD HANDLING SYSTEMS

Booklet describes, diagrams and illustrates mold handling systems for efficient and economical handling of large, medium and small size molds. Continuous or intermittent operation. Photos show typical installations. *C. O. Bartlett & Snow Co.*

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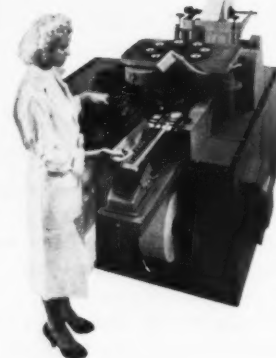
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MATERIALS TECHNOLOGY

An issue of the firm's scientific publication gives a condensed descriptive resume covering new products developed during past several years. Includes new forms of silicon carbide, fused refractories, fused magnesium, zirconium, hafnium, hot pressed alumina and others. Contains handy tables. *Carborundum Co.*

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PERMANENT PIPING COUPLINGS

Bulletin describes a line of couplings designed for quick addition or removal of relief, flow control or check valves in permanent hydraulic or pneumatic installations. Lists two sizes available in three finishes and three metals. Discusses features of the couplings that are especially designed for permanent piping. *Snap-Tite, Inc.*

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DEEP TROUGH BELT IDLERS

Booklet contains selection data on 60 new 35-degree deep trough idlers and 24 new additions to a line of 45-degree idlers. Includes capacity ratings and design information for the 35-degree idlers and lists 12 types of 35-degree and six new types of 45-degree idlers for belt widths from 24 to 60 ins. *Link-Belt Co.*

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2000-LB. CAPACITY TRUCK

An electric truck that has been specifically designed for fast tiering of unit loads under the most restricted warehousing conditions is the subject of this bulletin. Discusses outstanding maneuverability for narrow aisle operations. Includes drawings, charts, detailed specifications, design and operation information. *Elwell-Parker Electric Co.*

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DATA ON GLASS

Properties of 32 commercial glasses are detailed in this booklet. Covers mechanical properties, thermal stresses, heat transmission, electrical properties, corrosion resistance, viscosity data, thermal expansion, and optical properties. Includes a temperature chart for converting Fahrenheit degrees to Centigrade degrees and Centigrade to Fahrenheit. *Corning Glass Works*

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GIANT PUMPS

Pumps, designed to permit effective control and regulation of huge volumes of water is the subject of this bulletin. Includes complete details on the two types one an axial flow propeller type and the other a mixed flow type, both available in single or multi-state designs. Discusses types of available drives and photos of installations. *Peerless Pump, Hydrodynamics Div., Food Machinery & Chemical Corp.*

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PLANNED ANNUAL RETOOLING

Publication shows how a planned annual retooling program can increase output of screw driving, grinding, nut-running, drilling, and similar production operations. Offers basic formulas for computing the dividend on payroll dollars possible by planned retooling and includes a handy slide rule computer for rapid calculation of gross dividend on payroll dollars. *Ingersoll-Rand Co.*

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SPECIAL MANUALS

FOR YOUR FREE COPY, CIRCLE APPROPRIATE KEY NUMBERS ON POSTCARD, p. 91

WELDING

Welding Presses

Data about a clover-type welding press designed for the automotive and appliance industries. Discusses features of the press and includes complete dimensional data. *E. W. Bliss Co.*

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Selenium Rectifiers

Booklet devoted to selenium rectifiers and their performance as rugged AC to DC converters for welding service. Covers stack construction, ratings, cell sizes and characteristics, efficiency, overloads and compares the advantages of selenium versus other rectifiers. *Miller Electric Mfg. Co.*

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Compare Oxy-LP Gas with Oxy-Acetylene Flame

Two wall charts show the distinctive traits of the oxy-LP gas flame in comparison with the oxy-acetylene flame. Each chart has nine reproductions in full color, with four illustrations referring to the welding flame and five to the cutting flame. *Smith Welding Equipment Corp.*

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Precision Welding Positioners

Descriptive data about a bench model turntable which can be adjusted to hold work in any position desired, from horizontal to vertical. Discusses load capacity and use for heliarc, arc or gas welding as well as brazing and soldering. *Superior Welding Co.*

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Fusion Welding at Work

Booklet gives a pictorial report of firm's developments in highly precise, fully automatic fusion welding equipment. The 27-page report includes applications where the equipment has been in use and equipment descriptions are also contained. *Sciaky Bros. Inc.*

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Resistance Welding Controls

Data about a new ignitron misfire detector which is designed to give the machine operator an indication of misfire on any one or more halfcycles of an operation. Also describes a current regulator for synchronous or non-synchronous control of welding current. *General Electric Co.*

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Welding Aluminum

Hardbound 190-page book devoted to the welding of aluminum alloys. In addition to basic, practical data on the individual processes, it includes information on choice of method to assist engineers, shopmen and designers at stage of the job when decisions are being formulated. Integrates new methods and improved techniques that have reached commercial importance. *Aluminum Co. of America*

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Low Temperature Silver Alloy Brazing

Booklet about six alloys that form a group of brazing compositions that are significant in terms of low temperature brazing. Contains basic data about these alloys, what they do, how to design joints for brazing, brazing steps and methods. A 24-pager, well illustrated. *Handy & Harman*

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Electrodes

Catalog of welding electrodes opens with a selector chart for mild steel, hard facing, gas welding wire and stainless steel electrodes. Includes application information, physical properties and recommended range as well as AWS conformance data. *Shoher, Inc.*

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Multi-Duty Welders

This bulletin describes a line of AC-DC multi-duty welders with built in controls for easy and precise regulation. Outlines features of the welders, operation, available models and complete specification data. *Harnischfeger Corp.*

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Compact Welder

Specifications and complete information about a welding machine that features compactness. Outlines advantages of the compact machine that comes in three models. Includes illustrations. *A. O. Smith Corp., Welding Products Div.*

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Abrasives for Welding

Brochure covers abrasive products for the welding trade. Describes aluminum oxide resin bonded wheels for portable grinding; aluminum oxide vitrified bonded straight wheels for bench grinding steel and alloys of steel and reinforced abrasive cut-off wheels. *Bay State Abrasive Products Co.*

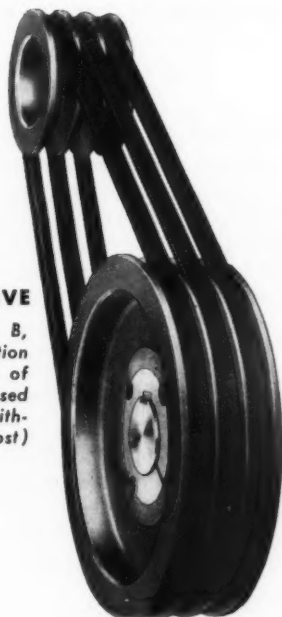
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Welding Studs

Bulletin about a line of welding studs includes specifications for threaded studs, collar studs and insulation pins. Also presents general information on plating, ferrules, fillet size and special studs. *Shielded Stud Welding Co.*

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Metallizing Spray Guns

Brochure gives complete information on newly developed spray guns and industrial applications such as metal build-up, repair and salvage of parts and equipment, and ceramic coating. Discusses exclusive vacuum feed feature. *Metallizing Co. of America*

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Longitudinal Welding Positioner

Bulletin describes a recent development which incorporates a miniaturized ram assembly to provide extremely accurate longitudinal movement of welding head in conjunction with a longitudinal welding positioner. Covers design, operation, special applications and experience. *Air-line Welding and Engineering*

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Modern Methods for Joining Metals

Booklet describes and illustrates the many ways in which metal parts are being joined by firm's welding processes. Covers heliarc welding, sigma welding, and firm's Union-melt and Union-arc welding methods. Contains illustrated application examples. *Linde Co., Div. of Union Carbide Corp.*

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Eye and Face Protection for Welders

A line of safeguards for welders is outlined and illustrated in this 27 page catalog. Includes goggles and glasses, replacement lenses, helmets and hand shields, headgear and accessories, replacement plates, face shields and windows, industrial respirators and miscellaneous products. *Sellstrom Mfg. Co.*

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Electrode Selector

Opener to this 21-page electrode selector is a chart of various specifications and line of electrodes which conform to the specifications. Catalog lists more than 1000 types and sizes of electrodes, grade and color marking, physical properties as welded, chemical analysis, general description, and competitive electrodes. *Metal & Thermit Corp.*

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Arc Welding Electrodes, Equipment and Supplies

Forty-page bulletin discusses the individual characteristics of line of electrodes, pointing out qualities that make each better for particular types of work. Contains a wealth of data on the various kinds of electrodes available, discusses hardsurfacing thoroughly and gives full data on line of welding equipment and supplies. *Lincoln Electric Co.*

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Ultrasonics and Welding

A paper on the status of ultrasonic energy as a metal joining technique. Discusses basic mechanism of ultrasonic welding, factors, applications, ultrasonics in other welding processes and conclusions. *Battelle Memorial Institute*

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Welding and Industrial Safety

Series of bulletins cover safety equipment for welders including fiber glass and fiber helmets, narrow-face helmets, safety cap and helmet combinations, face shields, a line of goggles for various uses and safety hats and caps. *Flood Safety Products Co.*

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Electron Beam Welding Process

Bulletin about a new welding technique which has special significance in regard to the newer metals and alloys which are difficult or impossible to weld with conventional techniques. Covers salient features of electron beam welding, how the process operates and the principal advantages. *Air Reduction Pacific Co., Div. of Air Reduction Co., Inc.*

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Welding with Bronze Electrodes, Filler Rod, Wire

Booklet describes line of bronze electrodes, filler rods and wire products including description and application, current, procedure for welding, amperage, chemical composition, mechanical properties, standard sizes and packaging, and typical applications. Discusses arc-welding techniques, processes and procedures. *Ampco Metal, Inc.*

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Aluminum Welding Cable

Bulletin outlines the advantages of using aluminum welding cable. Discusses six keys to efficient and satisfactory use of the cable which is available in rubber or neoprene jacket. Includes illustrations of connectors, connector supports and jacket grippers, describing how they work. *Tweco Products, Inc.*

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Hard-Facing Alloys

Booklet lists hard-facing alloys available as electrodes, rods, coils, crushed particle and powder, the welding process, Rockwell hardness, special qualities, and typical applications. Discusses manual oxy-acetylene hard-facing, mechanized hard-facing, spray hard-facing, machining and grinding practices. *Haynes Stellite Co., Div. of Union Carbide Corp.*

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Pipe Fitters Manual

Pocket-size 72-page field manual gives important mathematical, physical, chemical and metallurgical data and related design, layout and mechanical information at a glance. Covers characteristics of welded and threaded piping, electrode data and physical tips on welding and properties of pipe, metals and fluids. *Tube Turns Div., Chemetron Corp.*

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Magnetic Particle Inspection

Booklet describes some of the basics of magnetic particle inspection. Discusses the use of this nondestructive testing method in finding welding defects. *Magnaflux Corp.*

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Spot Welding Guns

Bulletin about a line of spot-welding guns describes features of complete security and pneumatic operation. Includes data on electrode holders and specifications. *Guthery Machine Tool Corp., Aro Spot-Welder Div.*

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Principles and Practices of Resistance Welding

Booklet contains 27 pages of comprehensive practical information on each of the basic methods of resistance welding. Covers spot welding, pulsation spot welding, projection welding, seam welding, and flash welding. *Federal Machine & Welder Co.*

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Arc Welding Circuits

Pocket-size booklet outlines the basic electrical principles that may be overlooked when trouble develops in the operation of an arc welding circuit. Points out the simple things that can cause trouble and cost money in shortening the life of accessories and equipment, increasing welding time and making inferior welds. *Lenco, Inc.*

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Welding and Cutting Equipment

Comprehensive catalog contains 68 pages of welding and cutting equipment. Describes features of line of torches, torch nozzles and tips, hand cutting and machine cutting torches, cutting tips, regulators, regulator adaptors and portable shape cutting and flame cutting machines. Includes operation data charts and many illustrations. *Vic-tor Equipment Corp.*

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Aluminum Joining Manual

A complete survey of aluminum welding, brazing and soldering is included in this comprehensive 40-page illustrated pocket-size manual. Covers welding aluminum and its alloys by inert gas shielded metal arc with a consumable electrode, inert gas shielded metal arc with a tungsten electrode and the latest arc and gas welding processes. *All-State Welding Alloys Co., Inc.*

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Pocket Guide to Better Welds

This 80-page vest pocket guide to better welds covers proper procedures, metal identification, common faults and data for selecting electrodes. The handy reference is designed for both beginner and veteran in arc welding, opening with five essentials for proper welding procedures. Includes descriptions of welding symbols and definitions of welding terms. *Hobart Bros. Co.*

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Automatic Welding Systems

Features of a newly developed automatic dual-head track machine is the subject of this brochure. Describes and illustrates operation, pointing out advantages. Includes specifications. *Stoody Co.* . . . FOR YOUR COPY, CIRCLE NO. 233

Welders' Protective Leather Supplies

Gloves, garments and welders' leather supplies are the subject of this catalog. Includes gloves and mittens, cape sleeves, aprons, jackets, coats and strap sleeves, overalls and accessories such as rod holders, lighter holders and inspector shields. *John Tillman & Co.*

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Compact Welder

Booklet describes new, compact 295-amp AC welder with built-in high frequency. Discusses features of automatic water and gas controls, post-flow control and high frequency intensity control for tungsten-inert gas welding. *Emerson Electric*

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Welding Guide and Catalog

In addition to complete data about a line of welding rods and electrodes, this 33-page booklet includes feature studies on how to get better stainless steel welds and the effect of alloying elements on weld metal properties. *Arcos Corp.*

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Welding Stainless Steels

Folder contains a handy chart on the chemical and physical specifications of a line of stainless steel electrodes. Lists grade of steel, AWS and AISI identifications, principal properties as welded, color codes, and chemical specifications as welded for principal alloying elements. Includes case histories. *McKay Co.*

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Fusion Welding of Nickel and High-Nickel Alloys

Book contains 54 pages of data and instructions on fusion welding processes applicable to these metals and their related alloys: oxy-acetylene, metal arc welding; submerged arc welding; inert gas metal arc welding; jigs, clamps, welding wires, fluxes, overlaying, hard surfacing, welded linings, cleaning and heat treatment. *International Nickel Co., Inc., Huntington Alloy Products Div.*

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Steel and Aluminum Data Book

Compact 221-page data book on steel and aluminum contains section devoted to weldability of steels. Covers carbon steels, alloy steels and stainless. Includes information on heat treatment of welded structures, significance of typical combinations, estimating electrode consumption as well as stainless electrode welding charts. *Joseph T. Ryerson & Son, Inc.*

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Water Cooled Torches

Features of a line of water cooled torches for tungsten inert gas welding are described in this brochure. Includes specifications, photographs and tungsten and gas nozzle sizes. *Tec Torch Co., Inc.*

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Oxy-Acetylene Welding and Cutting Equipment

Welding equipment, both oxy-acetylene and arc; welding electrodes and rods; and accessory items are described and illustrated in this 31-page catalog. Outlines features of the line and includes complete technical data. *Marquette Mfg. Co.*

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Carbon Arc Welding Torch

Instruction manual, pocket-size, describes the operation and use of the carbon arc welding process. Discusses numerous industrial welding applications in which this technique can be used including applications in the smaller shop. *Arcair Co.*

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Welding Cylinder Trucks

Brochure describes a line of trucks designed for protecting welding equipment with safety. Covers nine models of the truck including a heavy-duty model with a weight capacity to 167 pounds. Outlines applications, features and complete specifications. *Harper Trucks, Inc.*

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Plastic Welding Kit

Data about a plastic welding kit designed for field or in-plant maintenance, or production welding of any thermoplastic fabrication. Includes sizes for sheet polyvinyl chloride, branch and linear polyethylene and polypropylene as well as the various types of plastic welding rod. *American Agile Corp.*

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Design for Copper Furnace Brazing

This handbook for designers, engineers and manufacturers in the aero-space, electronics and commercial fields covers brazing practices, the controlled atmosphere copper furnace brazing process and variables affecting design. Includes photos of typical brazed assemblies and graphically shows the do's and don'ts of design. *Fabriform Metal Brazing*

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Maintenance Welding Data Book

Pocket-size 148-page data book is a guide, indexed by application, to nearly 200 different welding rods, electrodes, and chemical aids. Illustrates and explains general welding techniques and joint design hints. Discusses time, work and money-saving applications for welding, elimination of warping and other base metal damage. *Eutectic Welding Alloys Corp.*

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Stainless Steel Welding

Attractively illustrated 53-page booklet on welding, brazing, soldering and hot cutting stainless steels is divided into five sections. These include: welding the stainless steels; classification and description of welding methods; procedures for welding stainless steels by various methods; other methods of hot joining stainless steels; and hot cutting the stainless steels. *Republic Steel Corp.*

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Techniques for Resistance Welding

An introduction to the use of thin metal welders is the subject of this bulletin. Explains a method of resistance welding, steps to follow in making a weld, choosing the proper electrodes, electrode shape, electrode maintenance, setting the pressure, setting the heat, testing the weld and recommendations for basic material compositions. *Hughes Aircraft Co., Vacuum Tube Products Div.*

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Projection Welding Low Carbon Steel

Bulletin presents data to assist in selection of welding equipment and process variables for welding of low carbon steel with embossed projections in the thickness range of .011 to .245 inches. Discusses the formation of projection welds in three thickness ranges, the dies and electrodes used and the effect of the weld variables of each. *Taylor Winfield Corp.*

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All-Weather Welders

Bulletin describes DC arc welding units that are completely weatherproofed for use by ship builders, contractors and metal fabricators. Discusses features and specifications of the three models and includes data on optional equipment, accessories and installation of the units for parallel operation. *National Cylinder Gas Div., Chemetron Corp.*

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Repair and Fabrication Welding of Steel Castings

This 52-page treatise is the result of a research project sponsored by the Steel Foundry Research Foundation and sets forth recommended practice for repair welding and fabrication welding of steel castings. The booklet sets forth the best scientific thinking on the methods and quality control of welding of steel in relation to castings, cast-weld construction, and composite fabrication. *Tempil Corp.*

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Heat Treating Field Weldments

Bulletin describes a method of heat treating field welds by means of a self-contained exothermic reaction. Discusses use of the process to stress relieve welds joining fittings and pipes to large tanks, and weldments used to repair defects in cast headers and manifolds. Covers metallography of pipe and welds and advantages of the exothermic annealing process. *Exomet, Inc.*

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One-day delivery is forthcoming when you specify ACCOLOY KUPLEX Sling Chains. Made up locally by an authorized KUPLEX distributor, these slings feature matched Accoloy steel components, which have been proof-tested at the factory at twice working load limits. Assembled from Drop-Forged Shaped Masterlink, Kupler and Hook plus Accoloy 125 chain, they're available in six chain sizes ($\frac{1}{4}$ " to $\frac{7}{8}$ " in single, 2-leg, 3-leg and 4-leg styles.

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NEW EQUIPMENT

FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE



USE RIP OUT POSTCARD, PAGE 91, FOR MORE INFORMATION ON PRODUCTS DESCRIBED

PILLOW BLOCK UNIT

... principal feature is high quality bearings



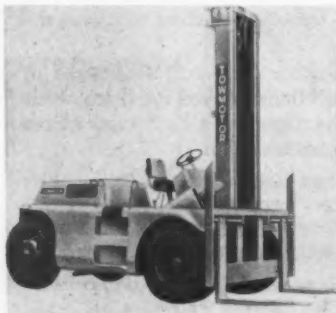
A new pillow block unit which incorporates high quality bearings has been announced. Sturdy, economical pressed steel housings provide a precision bearing-to-housing fit and a true self-aligning

bearing that effectively bridges the gap between light duty pressed metal housings and heavy duty cast iron housings. The new unit accommodates shaft sizes between $\frac{1}{2}$ and 1-7/16 inches. It is suitable for most pillow block bearing applications where moderate speeds, moderate radial loads, and relatively light thrust loads are encountered, as in fans, idler shafts, conveyors, pump shafts, and other lightly loaded power shafts. The design permits the use of standard rubber contact seal bearings with self-locking collars, which have proved themselves by long periods of satisfactory service under a wide variety of operating conditions. *Fafnir Bearing Co.*

... FOR MORE DETAILS, CIRCLE NO. 300

HEAVY DUTY FORK LIFTS

... for inside and outside use; capacities 10,000 to 24,000 lbs.



A powerful new series of fork lift trucks has been designed especially for heavy industry. All eight models of the new series feature a low-profile envelope-type body. Both gasoline and diesel powered models are available in wheel-bases ranging from

86 to 120 in. The envelope-type body and frame are welded into a single rigid unit and for increased strength, heavy duty deck plates have been added to all models. Forks are adjustable from 2 to 66 in. for maximum flexibility in handling diversified loads. The low-profile styling puts all truck components and lubrication points within easy reach, the parts most frequently serviced being top-mounted on the engine. *Towmotor Corp.*

... FOR MORE DETAILS, CIRCLE NO. 301

PAINT-ON SOLDER PASTES

... preparation does not settle, separate or harden in jar

A new formulation of paint-on solder pastes combines an exact balance of alloy and flux, and gives long shelf life without metallic elements settling, without flux separating, and without hardening in the jar. The paste, also available in a new "viscositized" formulation, comes in four types: all purpose, lead-free, non-blackening for stainless and nickel alloys; neutral, with non-corrosive flux for electronic work; and a special formulation for copper, brass and bronze. A special paste is made for high strength and corrosion resistance on stainless steel and other metals. *Eutectic Welding Alloys Corp.*

... FOR MORE DETAILS, CIRCLE NO. 302

STOCK SELECTING TRACTOR

... brings more automation to order selection



A tractor has been announced that steers itself by following an energized guide wire embedded in the floor by using a sensing device. This leaves the order picker free to work at top speed. He stops and starts the tractor

with a small radio transmitter attached to his belt. He presses a button, the tractor starts; he presses another, the tractor stops. Guidance along the route is automatic. The tow train is always at the order picker's side when he needs it and where he needs it. Speeds up to 6 miles per hour are available. *Barrett-Cravens Co.*

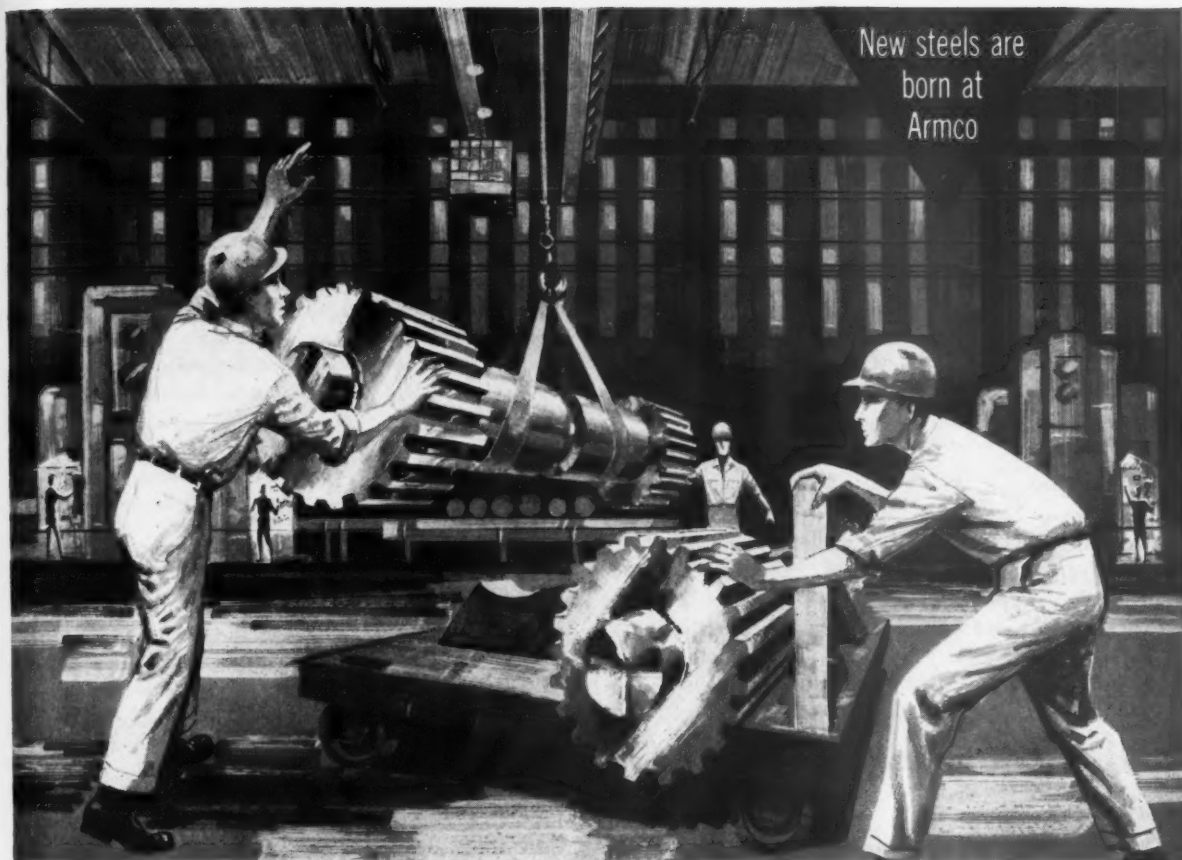
... FOR MORE DETAILS, CIRCLE NO. 303

TEFLON COATED WIRE CLOTH

... several applications have been developed for its use

The availability of Teflon coated grades of industrial wire cloth has been announced. The coating can be applied evenly over the entire surface of the cloth and will not interfere with mesh openings in mesh sizes as fine as 180 per inch. A typical application for this material is in a filtration operation where water is present. The Teflon coating has a tendency to hold the water back and allow other liquids to pass through. Other applications have been developed in the aircraft industry, in the submarine division of the Navy and in the manufacture of certain household appliances. *Cambridge Wire Cloth Co.*

... FOR MORE DETAILS, CIRCLE NO. 304

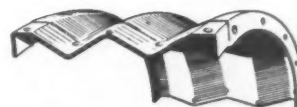


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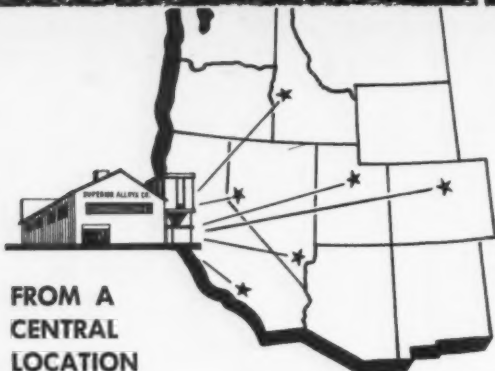


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Piggy Back Air Control

- Saves Space ● Improves Control
- Simplified Installation

This compact "3 in 1" combination Air Regulator, Filter, and Lubricator requires a minimum of space and installation work ... and delivers a maximum of protection against damage to costly air tools.

The balanced piston Regulator permits instant response to load changes ... automatically bleeds off ... and serves as a shut-off valve. The cyclone action of the Filter and its throwaway type filter element remove water, oil, and dirt. The Lubricator is adjustable, to automatically meter a fine oil mist in direct proportion to the volume of air being used.

Available in stock in 1/4" through 3/4" NPT. For a complete line of air controls and quick disconnects write for Bulletin 80.



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70

NEW STORAGE BATTERY

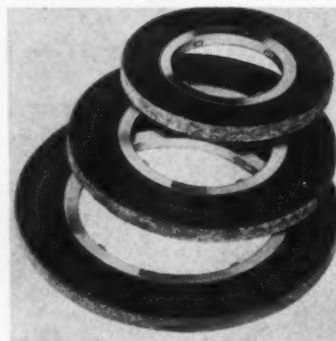
... electrical power for stationary service boosted 66%

Electrical power of industrial storage batteries for stationary service has been increased 66% by introducing a positive-plate design that is unique in application. The innovation, a tubular-type plate, has been incorporated in the new battery. Because the battery is so powerful and will last an estimated 20 years in float-charge service, costs will be considerably less per ampere-hour per year than conventional Plante' and flat-plate stationary batteries. Also, because the new battery stores much more power in a given space and is more efficient for its weight, it can save up to 64% of floor and mounting-rack area and up to 55% in weight. *Exide Industrial Div., Electric Storage Battery Co.*

... FOR MORE DETAILS, CIRCLE NO. 305

PRECISION FINISHING

... power brushing tools with greater performance life



New brushing tools that precisely control cutting action in industrial finishing operations have been introduced. Available in wheel diameters of 4 to 12 in., the new tools combine the efficiency of blended, straight wire cutting points, encapsulated in a

plastic bond to precisely control finishing action. Because of the precisely controlled cutting action, peening or rolling of metal edges is kept to an absolute minimum and, in many cases, is entirely eliminated. Edge blends can be held to extremely close tolerances, making possible production finishing of pump gears and similar products requiring an .005 in. edge blend. Applications include a wide range of operations removing burrs and blending edges of ferrous and non-ferrous fine pitch gears, removing flash of plastic parts, producing close tolerance edge blends on clad metal products, and burr removal and edge blending of powdered metal parts. In many instances, the new tools will replace finishing operations which formerly required the use of hard-to-remove deburring compounds. *Osborn Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 306

NEW ALUMINA

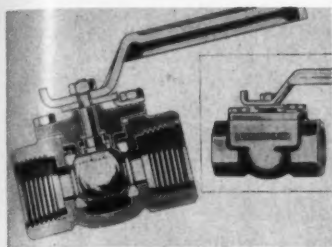
... high strength material for high temperature metalizing

A new alumina has been designed for applications where ordinary aluminas fail because of the special electronic requirements and service conditions. The new material is made up of 95% alumina blended with controlled quantities of selected oxides designed to make the material easy to metallize. Manufactured to the exacting requirements of the electronic engineer under high quality control standards, it insures tight seals and high bonding strength. The alumina has excellent dielectric values. Other properties of the material include a compressive strength above 400,000 psi and flexural strength above 45,000 psi. Its maximum working temperature is above 1700 degrees C. *Glad-ding, McBean & Co.*

... FOR MORE DETAILS, CIRCLE NO. 307

BALL VALVE

...top entry and ball design provide easy in-line maintenance



A new ball valve line, engineered for simplicity of design and maintenance-cutting operation, is being introduced in bronze body, screw ends, pipe sizes 1/4 to 2 in. with Teflon or Buna-N seats and

seals. It will be available in other materials. The illustrated valve has top entry through a removable cover. This exposes the ball, which is easily removed by the tool on the valve's specially designed handle. The ball is flat on both top and bottom, enabling it to be removed from the body for easy access to the seats in case they should need replacement, without breaking the pipe. The self-aligning ball rides on its seats, sealing at high or low pressure without springs or bearings. O-Ring seals protect against leakage at stem and cover. *Lunkenheimer Co.*

... FOR MORE DETAILS, CIRCLE NO. 308

BLAST CLEANING ABRASIVE

...when used under proper conditions, reduces costs

A blast cleaning abrasive designed to occupy a position between present malleable abrasives and steel both from the standpoint of performance and initial cost has been developed. The manufacturer describes the new abrasive as "a significant development, the product of a longtime research program, a material as close to steel as possible to make in a cupola." It is reported to last up to 2 1/2 times longer than malleable abrasives although not as long as premium grade steel shot. Speed of cleaning is faster than the lower hardness malleables, the same as the harder malleable abrasives but less than steel of higher hardness. *Pangborn Corp.*

... FOR MORE DETAILS, CIRCLE NO. 309

TEFLON RASCHIG RINGS

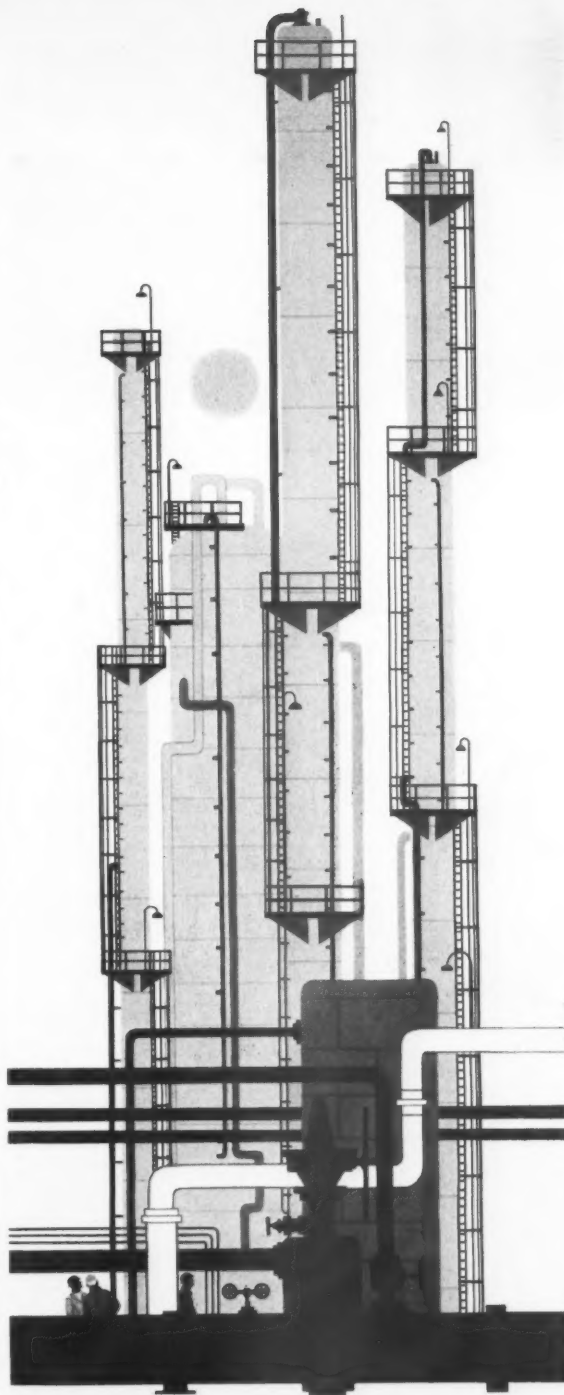
...for HF and acid processes at temperatures to 500 degrees F



The availability of Teflon Raschig rings has been announced. These chemically inert tower packings provide maximum product purity and maintain more uniform flow rates in mass transfer for longer periods than conventional materials. Made of non-porous, high density

TFE fluorocarbon resin, they resist tendencies of sludges, suspended or precipitated solids and contamination products to build up and restrict flow. The thin wall design of the rings combines optimum stiffness with light weight for maximum economy. Standard Raschig rings are available in 5/8, 3/4, 1 and 1 1/4 in. nominal O.D. and other sizes are available on request. *Resistoflex Corp.*

... FOR MORE DETAILS, CIRCLE NO. 310



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WOOD FOLDING RULE

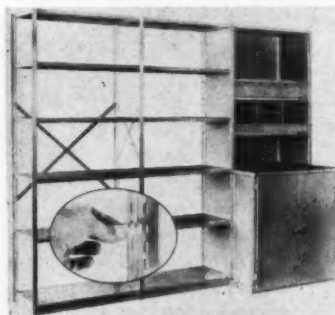
. . . new line incorporates many improvements

Two styles of six foot rules are offered in both regular or flat reading models in this new line, a fold tip extension rule has a boxwood finish and a silver tip folding rule has a triple-dipped white finish. Important innovations of these new rules include both the foot and inch markings on the entire length. Stud markings on 16-inch centers are also offered. Graduated solid brass tips are inserted in all end sticks to prevent splitting of the rule. Other advances include a newly developed abrasion resistant finish to assure longer legibility, strong brass plated steel joints that give added rigidity to the rock maple sticks when the rule is open, and a machine graduated extension slide on one model marked horizontally on the face and vertically on the back, making it useful as a depth gauge. *Evans Rule Co.*

. . . FOR MORE DETAILS, CIRCLE NO. 311

ALL-PURPOSE METAL SHELVING

. . . aluminum key locks and supports all parts



Aluminum is teamed with steel in a new, all-purpose metal shelving featuring a simple patented, aluminum key that locks and supports all parts of the shelving. Used in conjunction with strong, light aluminum "T" uprights and steel shelves, the

key brings new concepts of simplicity, strength, and clean design to metal shelving. The aluminum "T" uprights feature an everlastingly bright, natural finish, having clean-cut rectangular slots at one-inch intervals that permit shelves to be installed at any desired height and spacing. Since the supporting key covers but one slot in the upright, shelves may be installed as close as one inch above one another. Once inserted at the desired height in the upright, the key supports either a single shelf, or two adjacent shelves at the same height. *W. R. Ames Co.*

. . . FOR MORE DETAILS, CIRCLE NO. 312

MAGNETIC PARTICLE INSPECTION

. . . for detecting defective welds, cracks and flaws

A new magnetic particle inspection system has been developed to determine non-destructively the diameter of spot welds in stainless steel, such as cold rolled types 301 and 201 and in precipitation hardening grades such as PH15-7MO and AM355. Since there is a direct correlation between the diameter of a resistance spot weld and its tensile shear strength, the system can supply reliable weld strength information. When the specially developed solutions are poured or sprayed on the surface of a part, the magnetic particles are free to migrate to the solution. When the solution sets up as a strippable plastic film, the magnetic particles are frozen in place. The first two solutions have setting-up times of 20 minutes and 8 minutes without the aid of external heat or drying. *Budd Co.*

. . . FOR MORE DETAILS, CIRCLE NO. 313

TEMPERATURE INDICATOR

...for use in heat-treating and heat-processing fields

A precision temperature indicator that is designed to tell the metallurgist, engineer and metalworker when a surface has reached a specific temperature has been developed in stick pellet and liquid form in a wide choice of Fahrenheit ratings from 113 degrees to 2000 degrees. The metal surface is marked with the stick or liquid, or a pellet is placed on the surface. When the surface reaches the wanted temperature, the mark or the pellet quickly liquefies. The stick comes in a metal holder which enables the user to dispense the stick as needed and also prevents breakage and consequent loss of part of the stick. The liquid is packaged in a glass bottle with a brush dispenser in the cap, while the pellets are packaged 20 to a plastic tube. *Markal Co.*

... FOR MORE DETAILS, CIRCLE NO. 314

AIRCRAFT TOWBAR

...capable of towing aircraft weighing up to 155 tons



An aircraft towbar that can be operated by one man, yet it is capable of towing aircraft weighing up to 155 tons has been announced. Although designed primarily for towing jet planes, the towbar

also is used with DC-6 and DC-7 aircraft. It is Y-shaped and 16 ft. long. A hand wheel which controls a turnbuckle at the aircraft end of the towbar, adjusts the axle engagement pins until they are positioned into each end of the nose gear axle. A crank at the tractor end of the towbar adjusts the height of the tow-eye, permitting the tractor to back into place for hook-up. Once in position, the wheels on the towbar are lifted off the ground by means of the same crank, and the airplane is ready to be towed. The hook-up is completed in about 2½ minutes. The towbar is versatile and easy to use. *United Air Lines and Industrial Service Co.*

... FOR MORE DETAILS, CIRCLE NO. 315

CORROSION RESISTANT COATING

...exhibits the appearance and wearability of tile

Development of a highly corrosion resistant protective coating for application on exterior or interior metal, masonry or wood surfaces offers minimized maintenance and labor costs by increased protective life and performance. Easily and quickly applied by brush or spray on virgin or previously painted surfaces, the two-component formulation consists of 100% solids and entirely eliminates the use of shrinkage creating solvents. Applied at the rate of 250 to 300 sq. ft. per gal., a one-coat application produces the five mil coating thickness recommended by the National Association of Corrosion Engineers for maximum protection against many corrosive influences. The unique qualities of the coating are combined to afford unusual resistance against the destructive effects of most inorganic acids, corrosive fumes, industrial oils, solvents and water. The new product additionally imparts high resistance to impact, abrasion and temperatures ranging up to 250 degrees F. *A. C. Horn Companies*

... FOR MORE DETAILS, CIRCLE NO. 316

Rocketing Ahead with Service

IN STEEL TUBING



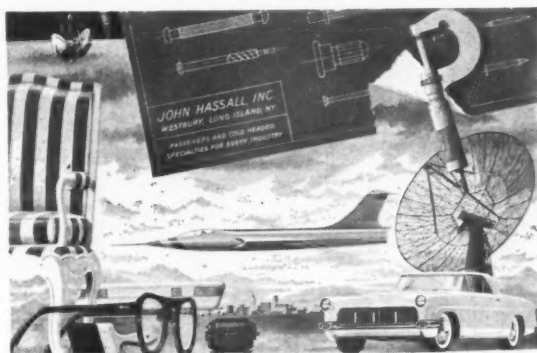
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HIGH FREQUENCY IMPACT DRILL

...with extension couplings, can drill holes 10 to 30 ft. deep



An impact electric drill with a high frequency rotating action combines all the best advantages of a heavy-duty electric drill and power hammer into one compact unit. The high frequency principle combined with high speed rotation creates non-destructive,

disintegrating action which drills all masonry and reinforced concrete faster, cleaner and more accurately. It cuts openings from 3/16 of an in. to 4 in. in diameter in concrete, brick, rock granite, masonry tile and terrazo slate for anchors, dowels, pipe holes, conduit. It cuts through embedded metals of varying hardness and density and is described as the only portable masonry tool which readily cuts through steel reinforcing rods embedded in concrete without deflection. Drill action provides clean, precise cuts without chipping, cracking or breaking out when close to an edge, with little or no spawling at the end of cut which makes possible close fitting of extensions in cast or masonry pipe without construction of catch basins. With proper extension couplings, the drill is capable of boring holes from 10 to 30 ft. deep, depending on the type of materials. *Stanley Electric Tools, Div. Stanley Works*

... FOR MORE DETAILS, CIRCLE NO. 317

BUTTRESS THREAD TUBING

...developed for application in the oil industry

Commercial availability of a new non-upset buttress-thread tubing for the oil country has been announced. Result of extensive research and practical application, the new non-upset type of tubing was developed to meet the need for a highly efficient, economical joint that will provide greater clearance between tubing and casing in multiple completion oil wells. The buttress-thread tubing is available in sizes 2 3/8 and 2 7/8 inch outside diameter in all grades and other tubing sizes will be available in the near future. *National Tube Div., U. S. Steel*

... FOR MORE DETAILS, CIRCLE NO. 318

CONVERSION UNIT

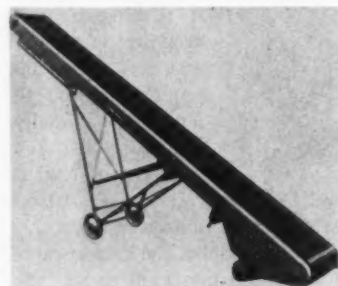
...for precipitators now using outmoded mechanical types

A new conversion unit comprising a long-life maintenance-free silicon rectifier especially designed for electrostatic precipitators now using outmoded mechanical types has been introduced. The new unit costs approximately 1/3 as much as a complete new power pack, a new power pack being the only other way to achieve silicon rectification for existing equipment. The new unit utilizes all existing equipment with the exception of the rectifier motor, disc, shoes, suppressor elements and pedestal. It readily ties in with present AC connections, and also with the DC switchgear which distributes the rectified power. The silicon rectifier has no moving parts and its electrical efficiency is approximately 25% greater than the mechanical type. Complete replacement can be accomplished in 6 to 8 man hours. All parts of both old and new rectifiers may be handled by one man, and no rigging is required in making the change over. *Buell Engineering Co., Inc.*

... FOR MORE DETAILS, CIRCLE NO. 319

PORTABLE CONVEYOR

...height is adjustable; total weight only 375 lbs.



A new portable belt conveyor with an easy to operate height adjustment has been developed. Large 8-in. diameter, ball bearing, rubber-tired front wheels make the portable conveyor easy to move and a simple raise-and-

lower mechanism that is spring counter-balanced provides quick and safe height adjustment. Its makers describe it as particularly suited to truck or rail car loading or unloading operations. Plants or warehouses with long lines of gravity conveyor will also find the unit valuable as an intermediate height booster to carry loads back to a height which will permit further use of gravity movement of materials. Driven by a 1 1/3-hp, 36-rpm, right angle gearmotor, the belt carries loads at a speed of 50 ft. per minute. Standard models are wired for 110-volt, single-phase electrical characteristics. *Mathews Conveyor Co. West Coast*

... FOR MORE DETAILS, CIRCLE NO. 320

MOYNO—the problem solving pump

If your pumping problems are a little different, the entirely new MOYNO may be exactly the pump you need. Its unique helical screw operation makes tough pumping problems easy—enables the MOYNO to handle almost anything that will push through a pipe, from free-flowing liquids to non-pourable abrasive pastes; even handles substances containing solids in suspension. Only one moving part—no pistons, no valves, no high-speed impellers. Provides positive displacement, low turbulence, continuous uniform flow. Capacities to 500 gpm; pressures to 1000 psi. Also available in sanitary types.

FERNHOLTZ MACHINERY COMPANY

8468 W. Melrose Pl., Los Angeles 46, Calif.
Phone OLive 3-2360



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... for more details, circle No. 45 on Reader Service Postcard
WESTERN INDUSTRY/NOVEMBER 1960

NEW ALLOY STEEL

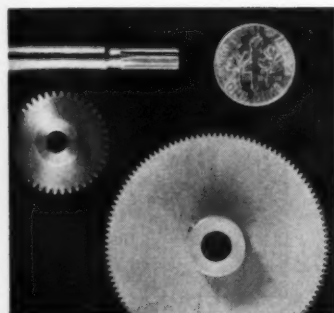
...designed for service in anti-smog devices

Development of a new alloy steel specifically for service in automobile anti-smog devices now being developed to meet requirements of California's new air pollution legislation, has been announced. The new proprietary grade is nominally 21% chromium, 6% nickel, and 9% manganese. It is a modification of an alloy steel developed previously for exhaust valves in modern high-compression engines which must withstand temperatures as high as 1200-1400 F. Two methods are now under consideration for removal of harmful hydrocarbons from automobile exhaust streams. One method uses a catalytic device; the other uses a thermal afterburner to accomplish the same result. The material of construction for either type of device must have high strength at elevated temperatures, good heat and corrosion resistance, and be unaffected by lead salts in exhaust gases. Tests to date have demonstrated the new alloy steel's strength at high temperatures and its resistance to lead salt attack. Also, it can be worked and fabricated using conventional techniques and equipment. *Armco Steel Corp.*

... FOR MORE DETAILS, CIRCLE NO. 321

PRECISION GEARS

...range from 1/10 to 2 1/4 in. in outside diameter



To meet space-age demands for dependable accuracy in gearing for miniaturized products, a full selection of fine pitch precision spur gears have been developed. Standard sizes range from 48 to 120 D.P., 10 to 40 teeth in stainless steel, and 42 to 180

teeth in aluminum. Each gear is certified to be AGMA Precision Class 1 or better. All materials and protective finishes conform to Federal and Military specifications. The small gears are used in instruments, meters and controls, and in precision components for aircraft and missiles, computers, communications apparatus, and similar electro-mechanical equipment. *Boston Gear Works*

... FOR MORE DETAILS, CIRCLE NO. 322

Specify
DAYTON
Sorbocast

DAYTON FOUNDRY

HOLLYDALE, CALIFORNIA

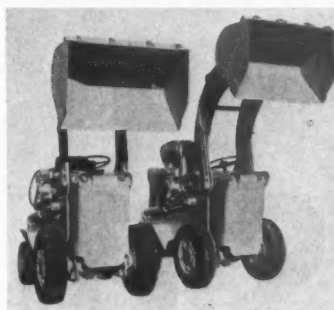
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WESTERN INDUSTRY/NOVEMBER 1960

EXTRA HIGH LIFT TRACTOR

...for specialized bulk materials handling requirements



To meet bulk handling situations in which extra high dumping, such as into high bed road trucks, large containers or foundry sand mullers, is required, an industrial tractor shovel with an extra high lift has been developed.

The new units provide a full 7 ft., 2 in. of dumping clearance an increase of 14 in. over the firm's standard models. High dumping clearance in the special tractor shovel has been accomplished with no sacrifice to the unit's digging capacity, full-load, 45 degree bucket tip-back carry position and overall speed of operation. Capacity of the tractor shovel is 1600 lbs. The angle of dump with the higher bucket is 43 degrees. Necessary lengthening of the model to achieve the high dump clearance adds only 10 in. to the turning radius, permitting ample maneuverability to operate in and out of freight cars. Longer bucket arms to increase the height provide a maximum reach of 42 in. achieved with the bucket at a height of 53 in. The special tractor shovel units can be provided with a full range of buckets from 12 to 27 cu. ft. capacity. *Yale & Towne Mfg. Co., Yale Materials Handling Div.*

... FOR MORE DETAILS, CIRCLE NO. 323

Surety saves you money

FOUR-2-ONE

VINYL IMPREGNATED WORK GLOVES

PROVIDING

*Longer Wear at
Lowest Cost*



SLIP ON
STYLE



KNIT WRIST
STYLE

As the name indicates, count on these Surety gloves outwearing cotton and many leather types four or more to one in most work. Users report great resistance to snagging and abrasion plus easy finger flexing and hand comfort. You can wash them, too; come up sparkling bright and lint free. Available in men's and women's sizes, two styles illustrated. Want samples? Check your Surety distributor or write today.

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a western mill source for...

STAINLESS STEEL STRIP



CALSTRIP is the only mill in the entire west rolling stainless steel strip. The Sendzimir mill, and a new annealing and pickling line produce cold rolled stainless, 400 and 300 types, in high lustre or dull finish strip. This precision rolled product is designed to meet your most exacting requirements in widths to 13", and thickness range from .008" to .060".

Now, profit from Calstrip's fast local service, and on-the-spot attention to all your cold rolled strip requirements.

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WESTERN INDUSTRY/NOVEMBER 1960



WESTERN INDUSTRY NEWS

THE INDUSTRIAL WEST . . . ON ITS WAY

PLANTS • PRODUCTION • DISTRIBUTION • PERSONNEL

Alaska's First Crude Oil Pipe Line Opened

ANCHORAGE—Completion of Alaska's first crude oil pipe line, the \$5,000,000, 22-mile line between the Swanson River-Soldatna Creek oil fields on the Kenai Peninsula and the Cook Inlet terminal of Nikiski was marked with an impressive dedication October 10.

The pipeline, a joint venture of Richfield and Standard of California, will deliver 5,000 barrels of oil daily to storage units at the terminal site for trans-shipment to tankers. The terminal is now near completion. It consists of tankage, office buildings and a 1,000 ft. causeway leading out to the dock.

Trane Co. Constructs New Facility in Utah

KEARNS, UTAH—Construction has started on the \$1,500,000 manufacturing facility here by Trane Co.

The 84,000 sq. ft. structure will be used for manufacture of air conditioners, heating units, fans, ventilating equipment and heat transfer coils and also will house facilities for partial fabrication and final assembly of refrigeration compressors, said D. C. Minard, president of the LaCrosse, Wis., firm.

The new plant at 4700 South and 5100 West is scheduled for completion in February 1961.

New Industrial Design Firm For San Francisco

SAN FRANCISCO—A group of industrial designers have formed an organization, Affiliated Industrial Design, 561 Clay St., here. The new firm is headed by Jo Sinel and Norman Steuer. James R. Pendergrast will serve as marketing director.

Permanente's New Hawaii Plant in Operation



Centerpiece of Hawaii's newest industry is a giant 450-ft. long rotary kiln. At right are raw material storage silos and mill building. To the left are finished cement storage silos and service building. The plant represents an investment of approximately \$13,000,000 by Permanente and replaces the company's former system of transporting cement to Hawaii by company ships.

HONOLULU—Hawaii has gained a new measure of economic independence with first shipments of locally produced Permanente cement now in use by Island customers.

The new facility at Waianae, Oahu, replaces Permanente's 20-year old system of transporting bulk cement to the Islands in company vessels from California.

Continuing tests of materials, facilities, and finished products have proved conclusively that the Waianae cement closely matches the high quality Permanente cement produced and shipped from the mainland.

Rated annual productive capacity of the facility is 1,170,000 barrels of cement. It is among the very few cement plants in the world using limerock as its basic raw material.

Cutler-Hammer Relocated In New Belmont Plant

BELMONT, CALIF. — Cutler-Hammer Inc., has begun operations in its new plant in the newly developed Belmont industrial area.

The plant, which contains more than 35,000 sq. ft. of floor space, houses the company's manufacturing, sales office and warehouse activities.

Previously, the electrical firm had manufacturing and office facilities in San Francisco and a warehouse in San Jose, Calif.

J. M. Cook, vice president marketing, said the consolidation of these activities under a single roof will result in more efficient operations.

The new plant produces Cutler-Hammer's motor control lines and power distribution equipment.

Fairbanks Morse Announces Electronics Device Plant

ALBUQUERQUE, N. M. — Fairbanks, Morse & Co. has announced plans for a million-dollar research division here which will produce an electronics device for business use.

David Karr, head of the parent company of Fairbanks Whitney, said, "We hope to be in operation by the end of next year and are planning on a \$15,000,000-a-year gross business operation. We'll employ from 200 to 300 people at first."

Porta House Establishes So. California Quarters

OAKLAND, CALIF.—Porta House, builder and distributor of prefabricated portable field offices and tool sheds, is opening a new branch office and service yard in Los Angeles.

The firm has its prefabricating plant and general office at 6767 Broadway Terrace, Oakland. The new Los Angeles yard will make it possible for the firm to deliver and erect a complete Porta House any place in Southern California within 24 hours.

\$17,000,000 for California Chemical Co. Facilities

SAN FRANCISCO — A new complex of chemical plants, to cost nearly 17,000,000, will be started soon at the Richmond, Calif., refinery of Standard Oil of California, it was announced Oct. 10 by California Chemical Co., Standard's chemical subsidiary.

The new facilities will produce enough paraxylene, a petroleum chemical raw material, to increase Richmond's annual output by 41,000,000 lbs., as well as providing more than 100,000,000 lbs. per year of high-purity orthoxylene.

Construction is expected to be completed in late 1961 or early the following year. Process design will be coordinated by California Research Corp., research arm of the parent company. Construction will be directed by company engineers.

Oronite Chemical Co., a member of the Cal Chemical group, pioneered in the commercial production of paraxylene from petroleum in 1950 when the first Richmond plant went on stream. To supply a steadily growing demand for this chemical by manufacturers of synthetic fibers for wrinkle-resistant fabrics and high-strength packaging films, a second plant was built at the El Segundo, Calif., refinery and later a third plant at Richmond.

Oronite has also marketed orthoxylene from present Richmond plants, and was the first to derive from it a chemical raw material, phthalic anhydride. The latter product finds wide use in the manufacture of alkyd resin paints and shower curtains, hoses, and other plasticized materials. In its pure form, orthoxylene has a rapidly growing market both in the U.S. and abroad, where local plants convert it to phthalic anhydride. Oronite's first commercial phthalic plant was built in 1945.

Royco Instruments Moves To Palo Alto Facilities

PALO ALTO, CALIF.—Royco Instruments, Inc. has moved its offices and production facilities from Mountain View, Calif., to a 6,250-sq-ft structure at 440 Olive St., here.

In addition to the engineering and production of the corporation's line of temperature-measuring instruments, the new facility will also house initial production of the recently introduced Royco atmospheric particle monitor.



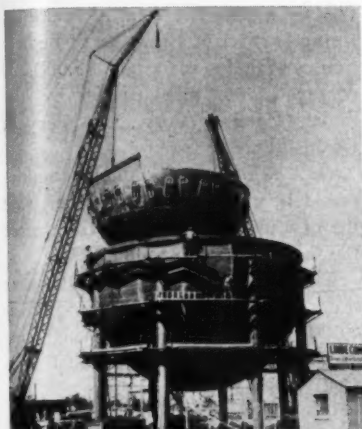
NEW MILLER CONSTANT POTENTIAL D.C. WELDER CP-3-VS

X-ray perfect MIG welds on aluminum, magnesium, stainless and carbon steel sheets down to .030" are the routine result with the New Miller Constant Potential, CP-3-VS. Continuous slope and voltage adjustment even during the course of the weld means that the operator is able to "tune in" the desired settings. There's no burn-through; there's no spatter. Actually, a new performance high in low voltage welding is established with the introduction of this welder with its broad range of from 300 amps at 30v to 25 amps at 10v. * Complete specifications, as well as recommendations for your particular application problems, will be sent promptly upon request.

miller ELECTRIC MANUFACTURING CO., INC., APPLETON, WISCONSIN
Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

... for more details, circle No. 49 on Reader Service Postcard

Linde Builds On-site Oxygen Plant for CF&I



PUEBLO, COLO.—Installation of a huge aluminum sphere marked a major construction phase at Colorado Fuel & Iron Corp.'s new on-site oxygen plant in Pueblo, Colo. The 13-ton, specially-insulated sphere will store 25,000,000 cubic feet of oxygen in liquid form at the super-cold temperature of 300 degrees below zero Fahrenheit.

Built by Linde Co., Div. of Union Carbide Corp., the plant will supply more than 200,000,000 cubic feet of oxygen per month for CF&I's mill operations and for two new oxygen converters also under construction. The converters will permit a 30% boost in steel production when completed by CF&I.

Linde's on-site oxygen plant is scheduled for completion in March, 1961.

Pacific Machinery Plans Warehouse and Office

PORTLAND—A warehouse and office project to cost \$275,000 is planned by the Pacific Machinery Co. in the Guilds Lake area of northwest Portland.

The warehouse is to have spread footings, concrete slab floor and tilt-up concrete walls with reinforced concrete columns, wood roof deck and roof beams and a built-up roof.

A rail spur will be laid through the building and provisions are made for trucks to roll through both ends. Both incandescent and fluorescent lighting are to be used.

The project, to be located at 3445 N. W. Luzon St., will enclose some 50,206 sq. ft. of floor space plus blacktopped parking area.

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at lower cost!

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Steel & aluminum frames for cases & cartons



All types of dollies for boxes & cases



2 wheelers for freight



"Auto-Load" barrel & drum trucks



CASTERS — all types



Tilt and non-tilt style platforms — wood and steel frames



Pry trucks for heavy freight



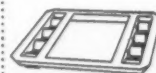
Jacks and semi-live skids



Mobile drum and barrel stands



Shelf tray trucks for stockrooms, warehouses & production lines



Pallet roll dollies — use where fork trucks can't be used

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BE SURE

of correct
screw or bolt
tension with

Snap-on

**Torque
Driver**

SNAP-ON torque drivers are available in three models with attachments to handle a wide range of jobs.

Model TQS-025 — Capacity: 3 in-lb and 48 in-oz

Model TQS-050 — Capacity: 6 in-lb and 96 in-oz

Model TQS-1 — Capacity: 12 in-lb and 192 in-oz

for Aviation - Electronics - Radio - Television - Radar ... any precision assembly work

This 1/4-inch drive SNAP-ON torque driver gives you precise control on jobs where screws or nuts must be tightened to exact tensions. Unit is extremely accurate, regardless of position, or manner of holding.

Easily read dial is calibrated in inch-ounces and inch-pounds and may be adjusted right or left for convenient use. Dial can be used two ways. Either set pointer at desired bolt tension and apply turning pressure to screw or nut until pointer reaches zero, or set pointer at zero and apply pressure until pointer reaches desired calibration on scale.

Available with variety of 1/4-inch drive attachments

Standard screwdrivers — 3 1/4" long: 3/16"x.032", 1/4"x.032", and 3/8"x.042" tips

Short screwdrivers — 7/8" long: 1/4"x.032" tip

Clutch-type screwdrivers — 1 3/4" long: 1/16", 5/64" and 3/32" bit diameter

Phillips screwdrivers — No. 1 and No. 2 bits in various lengths

Single hex sockets — 9 sizes, 3/16" to 1/2"

Deep single hex sockets — 9 sizes, 3/16" to 1/2"

Double hex sockets — 8 sizes, 3/16" to 1/2"

Double square sockets — 3 sizes, 1/4" to 3/8"

Extensions, ratchet adapters, etc.

A SNAP-ON Sales Engineer can give you more information on the value of torque drivers and TORQOMETERS® in your production or maintenance work. Well-stocked SNAP-ON Branches are located in every major industrial area. Check your phone book or write us for complete catalog listing the full range of wrenches and hand tools.

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• BUTTE (2-8762)

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EN

National Container Dedicates Facility

LOS ANGELES—The Central Manufacturing District was the site of dedication ceremonies for a new \$5,000,000 corrugated box plant opened by National Container Corp., subsidiary of Owens-Illinois.

G. J. Schneider, National Container president and general manager said the new plant is 2 1/2 times the size of the facility as it existed in 1950.

The plant, situated on a 10 1/2 acre site, is capable of producing over 4,000,000 sq. ft. of corrugated board in a 24-hour period. Plant location is 4240 Bandini Blvd.

Weyerhaeuser Co. Buys Lebanite Products Corp.

PORTLAND—Lebanite Products Co. of Los Angeles, a division of Cascades Plywood Corp., has been purchased by Weyerhaeuser Co.

The announcement was made in Portland jointly by John L. Aram, vice president of Weyerhaeuser, and Charles W. Fox, president of Cascades Plywood.

The transaction includes Lebanite's year-old 30,000-sq.-ft. building at 2700 Carrier Ave., Los Angeles, and equipment for the fabrication of panel products for industrial uses. With 25 employees, Lebanite makes specialty products of hardboard, particle board and plywood.

Reynolds Metals Expands Aluminum Reduction Unit

LONGVIEW, WASH.—A \$600,000 expansion of Reynolds Metals Company's aluminum reduction plant here, to make possible production of extrusion ingot, other improved ingot products and bar stock for making aluminum conductor wire was announced recently by D. W. Johnson, plant manager.

The expansion, scheduled for completion in about six months, will include additional floor area of about 13,000 sq. ft., Johnson said. The building addition, to be covered with aluminum roofing and siding, will house three new holding furnaces for processing of the metal prior to casting ingot of various shapes and sizes.

New equipment also will include a horizontal casting machine, sawing equipment and homogenizing furnaces.

Award to Republic Supply For Business Achievement

LOS ANGELES—Celebrating a half century of growth and service to Southern California industry, 200 business and industrial leaders gathered recently at a luncheon to honor the 50th anniversary of the Republic and Supply Co. of California and Chairman of the Board **P. M. Pike**, who founded the multi-million dollar firm.

The luncheon, held at the California Club, 538 South Flower, was sponsored by the Los Angeles Chamber



Republic Supply Co. of California founder and Board Chairman **P. M. Pike** receives Los Angeles Chamber of Commerce Business Achievement award. Left to right are Charles Detoy, past president of the Chamber, **P. M. Pike**, and **J. E. Fishburn, Jr.**, also a past president of the Chamber.

of Commerce. During the program, **J. E. Fishburn, Jr.**, treasurer and immediate past president of the Chamber, presented Republic Supply with a special Business Achievement award in recognition of outstanding contributions to the progress of the business community.

Founder **P. M. Pike** was also presented with a 50-year service pin by his son **John J. Pike**, who is president of Republic.

In addition to the industrialists, the luncheon was attended by a delegation of Coalinga, Calif., residents who were living in that city in 1910 when **P. M. Pike** opened his first store there.

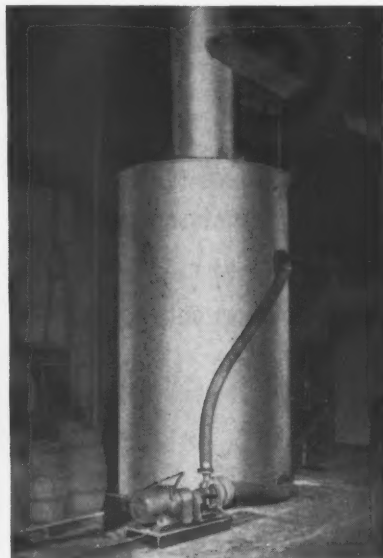
Republic Supply is a Western distributor of metals, industrial and water works supplies, tubing and oil field equipment.

Leach Corp. Opens Bay Area Office

PALO ALTO, CALIF. — **Joseph Pares**, Leach District Representative, has announced the opening of a San Francisco District Office for the Leach Corp. at 814 San Antonio Road, Palo Alto, Calif.



Heil Rigidon Plastic Fume Scrubber Neutralizing Mixed Acid Fumes.



Heil Lined Steel Fume Scrubber Removing Nitric-phosphoric Fumes.

Clean Your Exhaust Fumes With



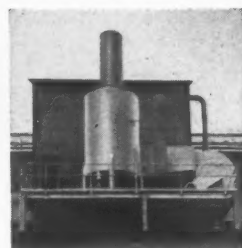
FUME SCRUBBERS

Standard Sizes from 1,000 to 30,000 C.F.M.
Rigidon Plastic or Lined Steel

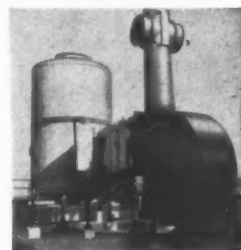
- Heil Scrubbers are moderately priced and operate with low pressure drop, minimizing fan requirements. Water can be recirculated; reducing the amounts of new makeup water required. There are no moving parts, nothing to wear out. Completely acid and alkaline proof construction assures maximum service life. Those built of Heil Rigidon (reinforced plastic) are light in weight, and usually can be installed on roofs without the added costs of reinforcing beams and trusses.

Let the Heil Corrosion Engineers, with 30 years experience, analyze your requirements, recommend the size and type of standard or special scrubber you need; also the auxiliary collecting hoods, ducts, fans and stacks, so that you have an efficient, dependable, completely corrosion-free system.

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Rubber Lined Fume Scrubber Removing HCL and Chlorides from Exhaust Fumes.



Rigidon Plastic Fume Scrubber 9 Ft. in Diameter in Chemical Plant Service.



HEIL PROCESS EQUIPMENT

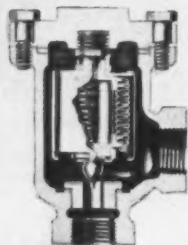
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highest discharge capacity
per dollar of cost with
SARCO balanced pressure
thermostatic steam traps*



Sarco No. 9-300. Cast steel body and cap with Monel metal bellows. Sizes: $\frac{1}{2}$ " to 2", 0-300 psi. Other Sarco No. 9 series traps available with phosphor bronze or monel bellows in sizes from $\frac{1}{2}$ " to 2" for pressures to 300 psi.

plus these **7** added advantages:

1. Same head and seat for whole range from 0 to 300 psi. No change of heads or seats for varying pressures and loads.
2. Fewer parts to stock for replacement — Same bellows, head and seat serve from zero to maximum pressure.
3. Extremely light and compact — $\frac{3}{4}$ " size weighs only 3 $\frac{3}{4}$ lbs.
4. Resistance to freeze-up — Wide open, self-draining when cold.
5. Easily maintained — The thermostatic element can be inspected or replaced in minutes, without removing trap from line.
6. Long element life — Thermostatic bellows constructed with large number of convolutions for long operating life. Limit stops on shield prevent overexpansion-damage to bellows.
7. Every trap steam-tested — At maximum rated pressure.

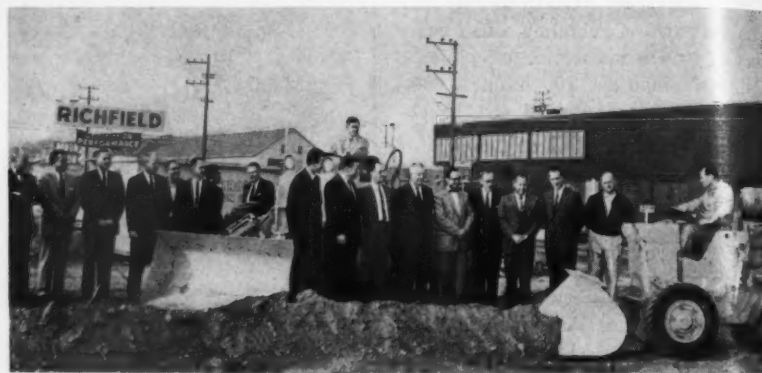
For more information on Sarco Balanced Pressure Thermostatic Steam Traps, contact your Sarco Sales Representative, District Office, or Distributor, or write for Bulletin 250. 2916

*1" size discharges 9650 lbs/hr. at 10°F. below steam temp., 125 psi.

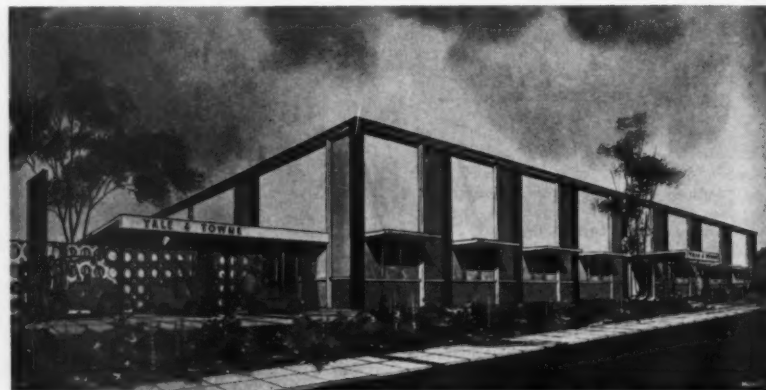


... for more details, circle No. 53

Yale & Towne's Future Quarters at San Leandro



Breaking ground with a Yale Y-18 industrial tractor shovel for Yale & Towne's San Leandro, Calif. regional sales and service headquarters are left to right in the foreground: Kaya Apaydin, architect, of Apaydin & Angell; Max Walden, realtor, Clarewood Co.; Nash Berger, Lathrop Construction Co.; Robert W. Hummel, lessor; Gunner Seyman, Director of Commercial Development and William A. Kinney, Chairman, Industrial Expansion Committee, San Leandro Chamber of Commerce; City Councilman Ken Cheatham, San Leandro; Lewis W. Goldenson, Branch Manager, Yale & Towne Mfg Co., and Bill Drinkward, Lathrop Construction Co.



Architect's drawing of the \$300,000 tilt-up concrete facility at 2303 Merced St. which encompasses 26,000 sq. ft. on a 65,000 sq. ft. site.

SAN LEANDRO, CALIF.—Yale Materials Handling Div., Yale & Towne Mfg. Co., broke ground recently for a \$300,000 industrial lift truck facility that will house a modern Sales and Service Center to serve the Bay Area and a Regional Parts Depot to supply the Western states.

Located centrally at 2303 Merced St. here, one block from the Nimitz Freeway, the structure is designed to handle local customer and regional dealer activity formerly located in Yale & Towne's discontinued manufacturing plant at 1251 Doolittle Drive in San Leandro.

L. W. Goldenson, manager of the local factory Sales and Service Branch, said the new facility will provide more area for the accomplishment of customer service work than was allocated in the manufacturing plant. This increase in space for service and parts inventory serving the Bay Area was necessary, he said, because of the

growth in industrial lift truck population over the past five years.

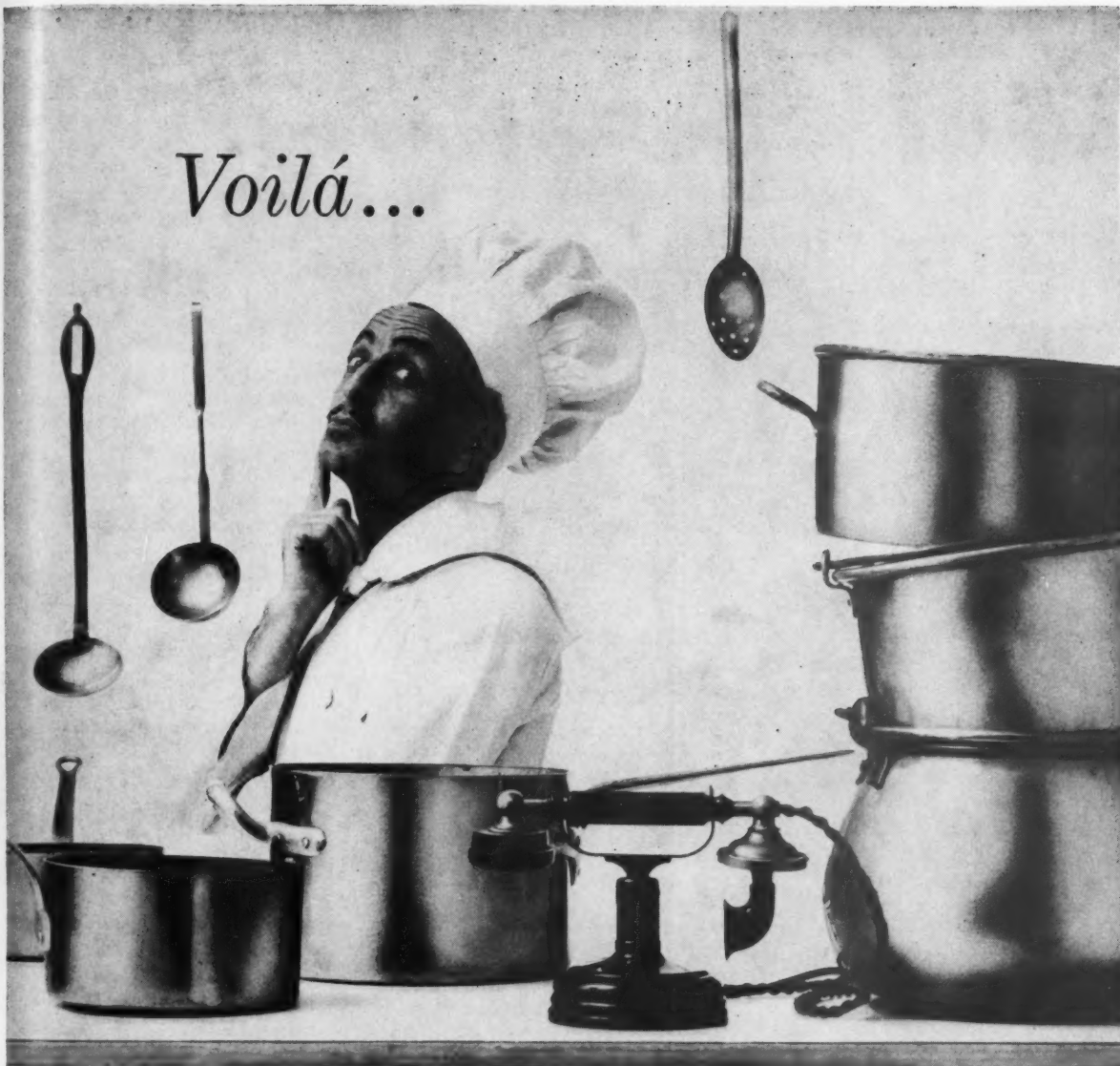
Goldenson pointed out that since 1955 well over \$30,000,000 has been spent by Bay Area industry in the purchase of gasoline powered lift truck equipment alone.

This expansion of lift truck population in Northern California and the West generally led Yale in 1958 to create a separate major replacement parts depot in San Leandro to handle the parts requirements of Yale branches and dealers in the 11 Western states, Hawaii, Alaska and Western Canada.

Inventory in the depot is now controlled by the lift truck industry's first electronic data processing system for replacement parts control.

The branch maintains a fleet of mobile service units for operational maintenance and trouble shooting tasks in user locations and several flat bed over-the-road trucks.

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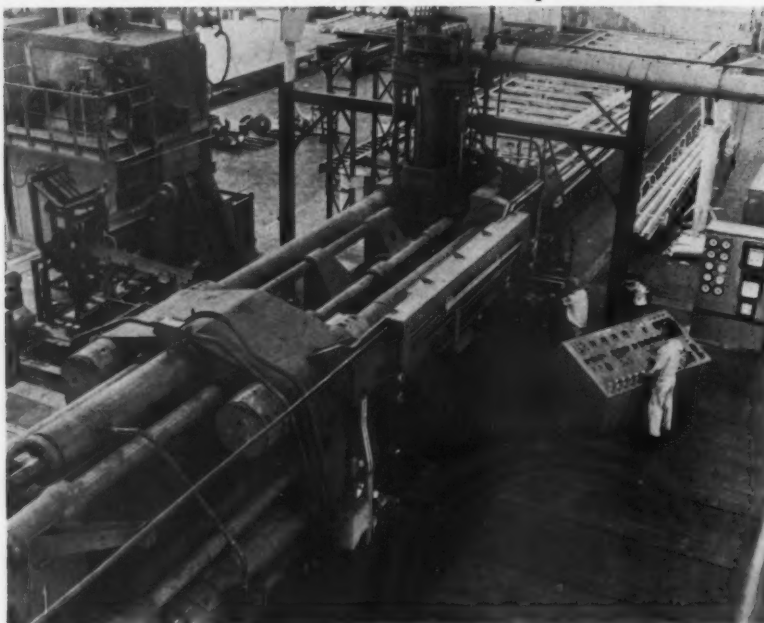
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WESTERN INDUSTRY/NOVEMBER 1960

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83-5

Alcoa Places 5200-Ton Extruder in Operation



An electronically-controlled high capacity extrusion press located at Alcoa's Vernon, Calif. plant enables production and processing of extrusions up to 34-in. square in cross sectional area.

VERNON, CALIF.—In operation at Aluminum Co. of America's plant near Los Angeles is a new electronically commanded 5200-ton extrusion press that has been installed as part of Alcoa's \$5,000,000 extrusion program.

Capacity of the press, up to 34 sq.

in. cross sectionally, will enable the firm to produce large sized extruded shapes for the transport, architectural, and aerospace industries.

Included in the overall expansion program for extrusions is a 750,000 lb. capacity stretcher and a new structure to house the press.

Mobile Calibration Service Announced

PASADENA, CALIF.—National Astro Laboratories, a quality assurance and instrument calibration service firm, has announced the operation of its first mobile, on-site calibration unit. Additional on-site service trailers are now in the planning and provisioning stage.

The first trailer is now providing metrology and inspection service to one of the local major airframe and missile systems manufacturers. Due to the heavy work load already realized by the customer's calibration and standards group, the N.A.L. mobile service unit is instrumental in helping the client meet his production and shipping schedules. Other trailers will be equipped with specific test and calibration equipment, designed to meet customer requirements in the fields of electronics, pneumatics and hydraulics.

San Diego Surveys Industrial Picture

SAN DIEGO, CALIF.—This city's first Industrial Week, held last month, was dedicated to salute present industrial volume and to cast a look to future growth.

A \$5,000,000 boost in projects is under way with dedications and ground breakings for seven manufacturing plants.

The city's Chamber of Commerce released the following statistics showing San Diego's industrial pattern.

Of approximately 70,000 men and women working in manufacturing, 69.8% are employed in the aircraft industry.

Twenty-two per cent of the county's total labor force of more than 311,000 is in manufacturing.

Another 21% is in trade fields and 17.8% is in governmental fields. More than 8% is in construction work, with agriculture and transportation dividing 8% of the total.

LA Industry Continues Fuel Switch Option

LOS ANGELES—Western Oil and Gas Association spokesmen have recently reaffirmed their industry's approval of the fuel switch plan that goes into effect when Smog Rule 62 is terminated. The auxiliary plan is a voluntary turn off of high sulfur content fuels.

Rule 62, that prohibits use of the fuel, runs from May to Oct. 31. Voluntary fuel switching begins Nov. 1 and runs to May 1.

Under the voluntary plan, industry will switch from use of high sulfur content fuels when the Air Pollution Control District forecasts indicate moderate to heavy eye irritation for the Los Angeles basin area.

Requests for a fuel switch are issued by the APCD about 2 p.m. the afternoon prior to a day slated for poor atmospheric conditions. The WOGA still contends that a voluntary plan would be sufficient for year around use and that Rule 62 does not insure relief of smoggy conditions.

Lewis Machinery Occupies New Burbank Facilities

BURBANK, CALIF.—Lewis Machinery Sales has completed and occupied a new 10,000 sq. ft. office and sales building at 207 S. Victory Blvd.

The display area is designed to dem-



onstrate all machine tools under power. Lewis stocks domestic and foreign lines in addition to extensive inventories of used machines.

According to Jerry Lewis, president, new lines will be added this year.

Tidewater Awards Contract To Fluor Maintenance Co.

LOS ANGELES—Tidewater Oil Co. has awarded a contract to Fluor Maintenance Co., Inc., a subsidiary of The Fluor Corp., Ltd., to perform turnaround maintenance of a fluid coker at Tidewater's refinery at Avon, Calif.

Transport Clinic Urges Uniform Carrier Rules

LOS ANGELES—Carriers, shippers and the men who make the state regulations for the transport industry met in half-day session at the Los Angeles Chamber of Commerce late last month to form the consensus that non-uniform statutes and regulations were hampering many carriers with red tape and discriminatory clauses.

Keynote speaker *Everett C. McKeage*, head of the California State Public Utilities Commission, made his case for a single regulatory system for basic for-hire carriers that would rule out much of the time, effort and public funds spent for investigation and clarification of disputes.

Judge McKeage also blasted the Federal Transportation Act of 1958 as it applies to reduction and discontinuance of rail passenger service as being "contrary to the public interest" and said that the major part of rail passenger service should not be abandoned.

Speaking out for the intra-state air commerce industry, *Assemblyman Rex M. Cunningham* declared that there is no coordination of State and Federal



Holding a pre-luncheon chat are Judge Everett McKeage, left, president of California Public Utilities Commission, and William C. King, vice-president, Richfield Oil Corp. and president of Los Angeles Chamber freight traffic committee. Judge McKeage was keynote speaker at recent Chamber transportation clinic.

laws with respect to regulation of the industry in California. Cunningham said his committee on public utilities and corporations will make recommendations to extend jurisdiction of the California Public Utilities Commission in this area during the next session of the Legislature.

Spokesman for the trucking indus-

try, *Arlo D. Poe*, general counsel, California Trucking Associations, asked that means be devised to control competition in the truck transport field, especially in regard to unlimited entry of new people into the enterprise.

Poe said it was "easy and inexpensive" to enter the business and as a result there are several thousand carriers operating in the state under one or more statutory provisions and that there is an unreasonable scrambling for business and severe competition with each other and the railroads.

Other speakers included *Claude Minard*, general counsel, California Railroad Association, and *Senator Randolph Collier*, chairman of the state Senate Transportation Committee.

Georator Corp. Appoints W. Bert Knight Co. Rep

LOS ANGELES—Georator Corp., manufacturer of electrical equipment has appointed the W. Bert Knight Co. here as their Southern California sales representative for the firm's permanent magnet brushless generators, alternators and frequency converters. Georator's home office is located in Manassas, Va.

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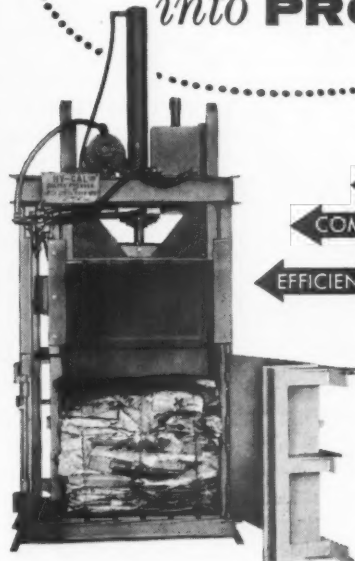
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New Torrance CPR Plant in Production



The new plant of CPR (Chemicals Plastics Research) International Inc. on a 6½ acre site at 555 N. Alaska Ave., Torrance, Calif. went into production last month. The company makes urethane chemicals, formulations, and products for the missile, marine, heating, airconditioning, packaging, construction and furniture industries. Present CPR available capacity of polyester base is 500,000 lbs. per day.

Dynamic Science Becomes New Marshall Subsidiary

SAN MARINO, CALIF.—Incorporation of Dynamic Science as a subsidiary of Marshall Industries was announced recently by *Gordon S. Marshall*, MI president. He pointed out that Dynamic Science Corp. will operate as an autonomous subsidiary of Marshall Industries and will maintain separate facilities from the manufacturing and sales divisions of the parent company.

M. Edmund Ellion, Ph. D., was named president and *Melvin Gerstein*, Ph.D., vice president and technical director of the new advanced research and technical development organization.

Dr. Ellion stated that he and Dr. Gerstein will lead technical studies and engineering development in advanced propulsion systems and energy conversion, thermodynamics, structural dynamics, solid-state physics, nuclear energy and other facets of general physics and chemistry. He stressed that Dynamic Science will have both government and commercial projects.

General Plastics Move To Larger Facilities

WEST LOS ANGELES—General Plastics Corp. has moved to larger plant facilities at 12414 Exposition Blvd., here, according to company officials. The building has 37,500 sq. ft. of manufacturing and warehousing area, and 3,000 sq. ft. for offices and showrooms.

General Plastics is a fabricator of thermoplastic sheet.

Pacific Lift Truck Expands Sales Staff

LOS ANGELES—Newly formed material handling equipment distributorship, Pacific Lift Truck Co. announced that its sales engineering staff has been expanded by the appointment of *Robert J. Beasecker*, *Gardner L. Hoch*, and *Wallace C. MacKinnon* to Los Angeles area sales territories. *Horace H. Fritz III*, president and general manager of the exclusive Yale lift truck representative, announced the appointments in connection with an over-all expanded service program.

Beasecker will serve lift truck users in the greater Los Angeles area including South Gate, Long Beach and Paramount areas. Hoch will service the Riverside, San Bernardino, Inyo and Pomona areas and MacKinnon will cover the Orange County, Los Angeles and Long Beach Harbor areas.

Located at 5711 East Olympic Blvd. in Los Angeles, Pacific Lift Truck Co. also operates the former Yale San Diego sales and service facilities at 4410 Kearny Mesa Road.

Rome Cable Div. of Alcoa Opens Phoenix Sales Office

PHOENIX, ARIZ.—The Rome Cable Division of the Aluminum Co. of America, Los Angeles, has opened its first divisional sales office in Arizona. The new office is located in the First National Bank Building, 411 N. Central Avenue.

Robert H. Kelley, formerly of the Alcoa sales office in Aberdeen, S. D., is manager of the Phoenix office.

Synthane Corp. Expands Glendale Facilities

GLENDAL, CALIF.—Within a year after establishing its first Pacific Coast fabricating plant here, Synthane Corp. has now installed complete fabricating facilities for its industrial laminated plastics.

This major expansion was announced by *Robert R. Titus*, president, who said that the Synthane Corp. California Div. at 518 Garfield Ave. was started early this year as an expanded warehouse with basic fabricating facilities. In addition to the warehousing of sheets, rods, tubes, and fabricated parts, there is now a fully-equipped fabricating service in Glendale.

Synthane Corp., which is headquartered in Oaks, Pa., has installed machinery and complete facilities for punching, drilling, shearing, turning, boring, milling and other fabrication of laminates.

Schurs Oil Burner Co. Changes Name, Owners

LOS ANGELES—Announcement of the sale of Schurs Oil Burner Co. to *John J. Pivovarov* has been made by *B. Christian Berg*, former president of the firm.

Along with change of ownership, the title of the business will be changed to Schurs Burner & Equipment Co. and



the firm will be housed in new facilities at 8956 S. Atlantic Ave., South Gate, Calif.

Pivovarov is former plant manager of Pioneer Aluminum Co. and indicates that the company will continue to make oil and gas burners and allied equipment for industrial heating and manufacturing applications.

Two years ago Schurs Burner purchased Superior Blower Co., Los Angeles fabricator of blowing and exhaustings equipment in a move to diversify their line of equipment.

Nawide Machine Drills 64,000 Holes Per Shift

CULVER CITY, CALIF. — A new circuit board drilling machine developed by a Los Angeles area firm is capable of making more than 64,000 holes per 8-hour shift and has eliminated hand drilling of printed circuitry at the Compton facility of Autonetics.

Developed by Nawide Machine Tools, div., Nationwide Engineering Services, the model 151 drills holes from .020-in. to .250-in. ID. Holes can be made with .001-in. of true position and minimum wall thickness between holes can be held to .004-in.

Women operators working beside a conveyorized assembly line at Autonetics operate the drilling machines with foot controls. Their hands are free to maneuver templates or stacked circuit boards on the work table.

Circuit boards are stacked under a template and are located by tooling pins. Stacks are placed under the throat of the machine and a stylus is lowered from above to fit into template bolts. Template and circuit boards are held to the work table by operator-applied pressure of up to 350 psi.



Alongside a conveyorized production line at Compton facility of Autonetics women operators drill holes for printed circuit boards with Nawide drilling machines. Foot controls free hands to position templates and stacked boards under the stylus. Note tooling pins, lower left corner of template, used to center circuit boards.

Drilling action is applied upward through the drilling table and begins when stylus pressure reaches a predetermined setting. The top circuit board is drilled only half-way through and then is placed on the bottom of the next stack to provide burr-free holes.

According to the manufacturer, misdrilling and scrap incidence has been lowered.

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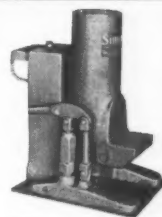
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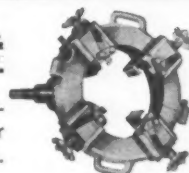
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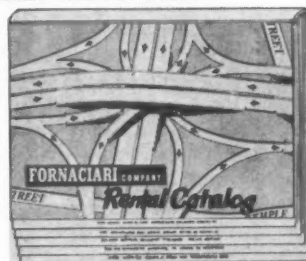
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87-5

New Company To Produce Special Microwave Parts

TEMPLE CITY, CALIF.—MCS Corp., a new facility which will build special microwave components for prime contractors, microwave laboratories, and microwave system builders, is now in operation at 5557 Rosemead Blvd., here, according to *Louis Della Penna*, president.

The company will produce to customer prints or requirements, any components in the range from S band up to the millimeter wave region. MCS does its own precision machining, brazing, plating, assembly of complex units, final testing, and calibration.

Three Companies Join, Form Lasco Industries

MONTEBELLO, CALIF.—Officials of Lasco Industries, Inc., a consolidation of three companies, Lynch Asbestos Co., Loscolite Products, Inc., and Lascopepipe Co., have announced the completion of their new plant and office facilities at 1561 Chapin Road, here, adjacent to the Santa Ana Freeway.

The company, undergoing an expansion of facilities under president *Roderick Lynch*, has moved into a new plant located on a 4½ acre site. The new building, covering more than 54,000 sq. ft., will house modern equipment for the manufacture of fiberglass panels, plastic pipe and other plastic and asbestos products which are marketed nationally under the Lasco tradename.

Reliance Steel Acquires Ralph Effron Steel Co.

PHOENIX — Reliance Steel and Aluminum Co. has announced the purchase of the Ralph Effron Steel Co., and the consolidation of both Phoenix operations under the Reliance banner.

Plans include enlargement of facilities and warehouse stocks.

The move, according to *William T. Gimble*, president, enables Reliance to supplement the efforts of their salesmen *Lyle Imler* and *John Donna* with the personnel and facilities of the Effron organization. Deliveries in the Phoenix area are available for mild steel, stainless steel, aluminum and magnesium. The new address is 929 East Jackson St.

Tubes Inc. Opens Steel Tube Service Center



View shows office area of new Tubes Inc. service center that has 20,000 sq. ft. under roof and will stock a complete line of steel tubing.

LOS ANGELES—A new tubing service center has been opened by Tubes Inc. at 2707 Supply Ave. and will be operated by *Chuck Baker* and *Harry Byerrum*.

Stocking a full range of carbon, alloy, welded and seamless tubing, the recently acquired facility has 20,000 sq. ft. of space and is fully equipped with OH cranes.

Available to customers will be delivery and cutoff services using the latest in processing equipment including a new DoAll installation. Opening of the service center marks the 23rd year of Baker and Byerrum in the local tubing business.

Marquardt's Cooper Div. To Relocate at Van Nuys

VAN NUYS, CALIF.—*A. B. Metsger*, vice president of the Cooper Development Div. of Marquardt Corp. has announced that the Division will move to Van Nuys, location of Marquardt's Power Systems Group. Since its acquisition by Marquardt in 1958, Cooper has maintained headquarters at Monrovia, Calif.

Metsger said the move will be effected during the next few months.

Pioneer Aluminum Dedicates New Headquarters-Warehouse

LOS ANGELES — Pioneer Aluminum, Inc., dedicated new headquarters and warehousing facilities late last month at 3800 E. 26th St.

The 170,000 sq. ft. plant will stock aluminum extrusions for the airframe industry in more than 10,500 shapes and dimensions. Also carried in stock will be stainless steel in all forms along with aluminum sheet, bar, rod, and tooling plate.



At the switch of an overhead crane is Chuck Baker shown during unloading of the first delivery of tubing inventory at the new service center.



Workers install new DoAll cutoff unit that will process orders at warehouse located at 2707 Supply Ave., Los Angeles.

San Diego Firm Named Rep For Sun-X Glass

SAN DIEGO, CALIF.—A newly formed San Diego corporation has been selected as the exclusive distributor in Southern California of Sun-X Glass Tinting, according to an announcement by American Glass Tinting Corp. of Houston, Texas, parent company.

Known as Sun-X Glass Tinting Corp. of Southern California, the new firm is located at 836 Columbia St., here. It will distribute the product in San Diego, Los Angeles, Orange, Imperial, Riverside and San Bernardino counties.

Sun-X Glass Tinting is one of the new "wonder plastics" manufactured by Du Pont. It is applied to existing windows by a unique flow process and becomes a permanent part of the glass. The product is said to greatly lessen or eliminate fading, heat, and glare caused by the sun's rays.

The distributing firm is headed by *Fred Wheeler*.

Aerospace Industries Foster Non-Military Product Lines

LOS ANGELES—The conception of many non-military industrial and commercial products has been the result of aerospace industry research. Robert E. Gross, Lockheed board chairman, told the Association of Bank Audit, Control and Operations late last month at the Statler Hilton.

A vast "non-military fall-out of products" has come from defense-based projects and has resulted in items such as miniaturized batteries and bearings and a wide range of electronic gear for industry, Gross said.

Microminiaturization and increased product reliability were cited by Gross as the most vital benefits to industrial and commercial products coming out of current defense spending, much of which is centered in Southern California.

Gross described what he called "logical planning" that was resulting in strong non-military aspects of a space program that would deal with items such as commercial satellites to be used for civilian communication purposes.

Walls Set In Place For New MCI Plant



Fred J. Robbins, left, president, and John J. Lawless, Jr., vice president, Metallurgical Consultants, Inc., hold blueprints as tilt-up walls are placed in position at MCI's new Montebello, Calif. plantsite. The 12,000 sq. ft. facility is valued at \$120,000, will house furnace brazing and metal processing operation by month's end.

Glen-Mar Door Mfg. Firm in Expansion

PHOENIX—Glen-Mar Door Manufacturing Co., which has supplied doors for some 200,000 homes in the South-

west, has moved into larger quarters at 310 So. 43rd Ave. here.

The new 30,000 sq. ft. plant marks the third expansion in a decade, according to Aram Mardian, president. Glen-Mar, with 40 employees, is believed to be the only flush door manufacturer between Dallas and the West Coast.

Almquist Co. Opens New Orange County Offices

SANTA ANA, CALIF.—Recently opened as part of an expansion program is a new sales office and warehouse of the Almquist Tool and Equipment Co. at 2902 S. Halladay St.

According to Carl Almquist, Jr., president and general manager, the site for the 4000 sq. ft. distribution center was chosen because of the increasing bulk of orders within Orange County.

Inventories will include abrasives, carbide and high speed metal cutting tools, light machine tools, and accessories.

Serving as manager of the Santa Ana branch is Tom McNicholas, formerly inside sales supervisor in the Los Angeles headquarters.

HOW LEADING WESTERN PLANTS PICK KEY PERSONNEL



See issue of
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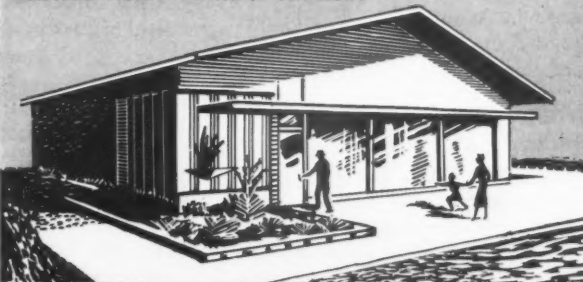
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Birtcher's Industrial Div. in Expansion Move

LOS ANGELES—Expanded demand for its line of electronic tube, transistor and component retention and cooling devices has made it necessary for the Birtcher Corp.'s industrial division to move away from its parent to quarters of its own, *Cecil Birtcher*, president, announced recently.

Manufacturing as well as sales facilities for the Kool Klamp and other electronic industry products have been moved to 745 South Monterey Pass Rd., Monterey Park, Calif.

The new quarters are a modern brick structure of 15,000 sq. ft. that will ultimately accommodate a production force of 300 employees.

Birtcher produces some 8,000 products including many sizes and configurations of clamps, retention and cooling devices of pure silver and silver plate for tubes and transistors, and cooling inserts for tube shields.

Charles Booher, vice president in charge of marketing for the division, will headquarter at the new plant.

Clauser Technology Corp. New Space Age Company

LOS ANGELES—Formation of a new company to engage in space-age research and development has been announced by *Dr. Milton U. Clauser*.

The new company, Clauser Technology Corp., will engage in the development and production of electronic equipment and instruments for the missile age and in government-sponsored research. Operations will be conducted at 24226 Hawthorne Ave., Torrance, Calif., while a permanent facility is established.

Dr. Clauser, who played a key role in the design of Air Force ballistic missiles, heads the new company as president. Assisting in the formation of the firm was *Draper, Gaither & Anderson*, venture capital firm.

Management Consulting Firm Opens West Coast Office

LOS ANGELES—Bruce Payne and Associates, international firm of management consultants, has created a Pacific Division to be headquartered in Los Angeles, President *Bruce Payne* has announced.

Payne said *James R. Richardson*, head of Richardson Associates, here, executive search specialists, would be general manager of the new division.

Garrett Supply's Annual Industrial Tool Show



Part of the crowd which numbered over 1,000 attending the second annual industrial tool and supply show held last month by the Garrett Supply Co. at Phoenix. Emphasis of the show centered on tooling, power transmission and safety equipment displays and demonstrations. Of the over 100 firms who supply Garrett, 22 had exhibits at the show.

Telecomputing Corp. Acquires Eastern Firm

LOS ANGELES—Telecomputing Corp. has established its first important operational base in the east with the acquisition of Computer Sciences, Inc., of Westbury, Long Island, N. Y. for an undisclosed amount of stock, *William R. Whittaker*, president, announced recently.

The New York acquisition adds to Telecomputing's expanding activities throughout Southern California and in Phoenix and Denver, which are engaged in astronautics, aeronautics, electronics, nucleonics, automation, physics, chemistry, and ground support for industry and government, as well as consumer sports equipment.

Networks Electric Corp. Holds Groundbreaking Event

CHATSWORTH, CALIF.—Groundbreaking ceremonies were held here recently to mark construction of a 25,000 sq. ft. plant on a 10 acre site.

According to *M. D. Patrichi*, president, floor space will be 50 per cent greater than in the company's present plant located in Van Nuys, Calif. The new facility will contain an enlarged infra-red laboratory setup.

Arcturus Manufacturing In Expanded Facilities

LOS ANGELES—In the first step of their proposed development program, Arcturus Mfg. Corp. recently expanded their operation into new facilities at 4474 East Olympic Blvd., here.

The new facility, which has in excess of 5,000 sq. ft., houses the new Fitting and Flange Div. where stainless, aluminum and low-chrome alloy forged fittings and flanges are finished and warehoused. The firm's other products will continue to be fabricated in the home plant in Venice, Calif., where the company started their operation 20 years ago.

Colored Pop Rivets Offered by Universal

LYNWOOD, CALIF.—Color pop rivets with baked enamel color finishes are being offered on the West Coast by Universal Molding Co., according to *Cliff W. Pratt*, president.

The tinted pop rivets that are set by a simple hand tool are used in assembly lines of the aluminum architectural products industry and in construction of aluminum trailers and signs.

Main feature of the new rivet is that it will blend with the component it fastens, Pratt said.

Semiconductor Plant For Golden, Colo.

GOLDEN, COLO.—Headquarters and plant site of a new subsidiary of Standard Kollsman Industries, Melrose, Ill., manufacturer of precision electronics components, will be established here.

The new subsidiary, Kollstan Semiconductor Elements, Inc., will headquarter at 1220 Ford St. and will mark the firm's first direct venture into the semiconductor field, according to *James O. Burke*, president.

The new facility will "produce material forms, active elements used in manufacture of transistors, diodes, rectifiers and other semiconductor devices," Burke said.

The initial staff of about 75, including physicists, scientists and engineers, will be under direction of *Norman J. Egli*, general manager, and *Lee Droege*, works manager.

P.I.E. In Move To Buy Bond Trucking

OAKLAND, CALIF. — Interstate Commerce Commission examiner *Elden J. Miller* has recommended approval of an application by Pacific Intermountain Express to purchase Bond Trucking Co. of South Gate, Calif.

If no exceptions are filed within the time limit specified, the recommended order will become the order of the Commission.

Should the transaction be approved by the ICC, it will extend P-I-E's operation into San Diego as well as traditional points in the Los Angeles-Corona-San Bernardino areas. In the interim, Bond Trucking is being operated by P-I-E under temporary management control.

Vista Liner Coach Expands Facilities

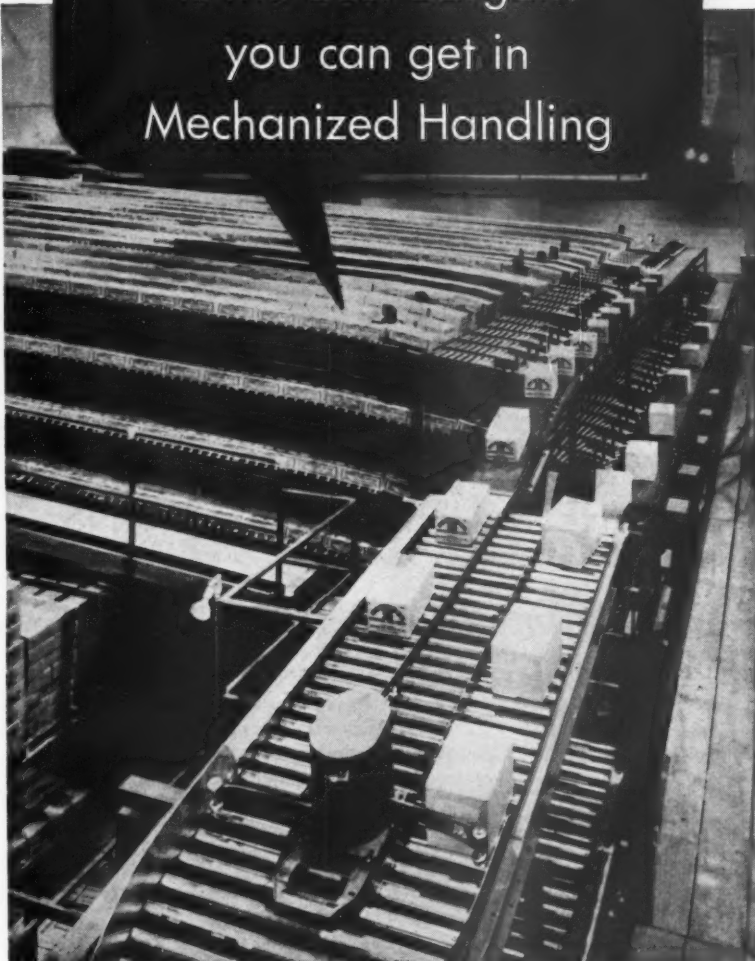
TOOELE, UTAH — A sixty percent expansion of production facilities of Vista Liner Coach and Trailer Corp. here has been started, according to *Keith Ensign*, general manager.

The past year has seen the Vista Liner employ figure climb from 24 to 40 persons, it was reported recently.

The remodeled facilities are expected to be completed within the next 30 to 40 days, he added.


The manufacturer of pickup coaches was started three years ago and now has 50 dealers in 25 states.

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Associated Insulation Forms a New Division

HONOLULU — P. L. Moody, president of Insulation Co., Ltd., has announced the formation of a new division specializing in the manufacture of portable, refrigerated, walk-in coolers and freezers.

George E. Reed, executive vice president and general manager, has named Myron A. Resnick, formerly with Pacific Air Conditioning Co., Inc., as manager and chief engineer. T. G. Thorsen has been appointed plant manager.

American Laboratories Add Testing Facilities

FULLERTON, CALIF. — Opening of a new additional 15,000 sq. ft. of test facilities, adjacent to the present buildings, has been announced by W. H. Grumet, general manager, American Laboratories, American Electronics, Inc.

Coincident with the enlarged facilities, Grumet said that a new acoustic test chamber will be placed in operation which will provide complete spectrum coverage for pyrotechnic and ordnance devices.

Nash-Hammond Named Harvey Aluminum Rep

TORRANCE, CALIF. — Harvey Aluminum has named Nash-Hammond, Inc., as sales distributor for its newly developed line of modular aluminum containers. The Harvey container is all-aluminum, developed for shipping missile components, military equipment, instruments, motors, and sensitive commercial products.

According to H. K. Holden, vice president of Nash-Hammond, the container is one of the most effective shipping and storage units on the market. It is lightweight, exceedingly strong, with integrally stiffened aluminum extruded skins welded together to form the cover and bottom assembly. The modular design permits size variation in three directions. The container also meets Specification MIL-P-116C.

To assist companies in the effective use of Harvey Aluminum modular containers, Nash-Hammond is setting up sales and engineering programs on a national basis. Specialists in reusable shipping containers and cushioning materials, Nash-Hammond maintains its general offices at 10141 East Rush St., El Monte, Calif.

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White Motor Co. Names New Ventura Distributor

VENTURA, CALIF. — The White Motor Co., heavy-duty truck manufacturer, has announced the appointment of Lou Marietta as distributor for White, Autocar and White-Freightliner trucks for Ventura, Santa Barbara and San Luis Obispo counties, according to Wilson D. Patterson, White's regional vice president of the Western region.

Taking over as president and general manager of the recently constructed Ventura facility, which operates under the name of Trucks & Equipment, Inc., Marietta announced that he will retain the same personnel.

The Trucks & Equipment shop is staffed by 15 full time mechanics and is equipped to handle all gasoline engine and Cummins Diesel engine repair work.

The White-Autocar distributor's building, with 5,600 sq. ft. of floor area, is located on a 5-acre site at 3400 Ventura Road. The parts department, which maintains approximately a \$75,000 inventory of parts, is under the direction of Gene Fitzgerald.

H. M. Parker Holds Two Day Exposition-Opener

NORTH HOLLYWOOD, CALIF. — Twenty manufacturers of welding equipment participated in an exposition and open house which marked the recent opening of H. M. Parker & Son's new welding supply headquarters at 11245 Van Owen St., here.

The event featured displays and demonstrations of modern welding processes by the participating companies and attracted more than 600 representatives of local industry and other



Art Owens, manager of the Welding Supply Div., H. M. Parker & Son, slices through chain to mark opening of two-day exposition at its new \$300,000 headquarters in North Hollywood, Calif. Left to right, H. M. Parker, chairman of the board, Art Owens, and C. S. Richmond, distributor sales manager in Los Angeles for Linde Co., Div. of Union Carbide Corp.

visitors. Among the show's highlights were demonstrations of electric welding, copper enameling and oxygen lancing presented by Linde Co., Div. of Union Carbide Corp.

The new headquarters include sales and administrative offices, a warehouse and a modern showroom for exhibition of the latest welding equipment.

H. M. Parker, a distributor for Linde Co. since 1921, supplies industrial gases and welding equipment to the automotive, steel fabricating, aircraft and electronics industries.

Fluorocarbon Company Announces Acquisition

ANAHEIM, CALIF.—Fluorocarbon Co., producers of fluorocarbon plastics, have purchased the assets of the Kel-F plastic division of Raco Engineering Co., Santa Monica, Calif.

The announcement was made by G. L. Angle, chairman of Fluorocarbon Co. board of directors Transfer of the Raco Engineering Co. Kel-F Div. to Fluorocarbon's new plant at 1754 S. Clementine St. has been completed and full production resumed, Angle said.



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Titan Metal Announces Smoke Abatement Plans

NEWARK, CALIF.—The Western Div. of Titan Metal Mfg. Co., only large brass mill in Northern California, has revealed plans to spend between \$60,000 and \$70,000 to help banish smoke and smog from this Southern Alameda County section of the San Francisco Bay Area. Titan is a division of Cerro de Pasco Corp.

James M. Golden, vice president in charge, announced Titan listed the estimated expenditure in a schedule for compliance with regulations, filed recently with the Bay Area Air Pollution Control District. Target date for completion is mid-August, 1961. Directing the project will be Harsell Engineering Co., Inglewood, Calif.

Dual goal of the program, Golden reported, is the prevention of smoke discharge in the plant neighborhood as well as in the plant itself. The task will involve extensive redesign and rebuilding of in-plant duct work and hoods over four electric furnaces used for melting brass and bronze alloys, plus installation of costly high-capacity facilities for filtering out smoke particles.

Arnold Machinery Appointed Tubar Rep for Utah, Idaho

SALT LAKE CITY—The appointment of Arnold Machinery Co., Inc. as exclusive distributors of Tubar Materials Handling Equipment for Utah and Idaho, north to and including Adams, Valley, Lemhi, Clark and Fremont counties was announced recently by the manufacturers, Uhrden, Inc. of Dennison, Ohio.

Under the name, Tubar, Uhrden markets engineered unloaders, dumpers, work positioners, lifts and cranes.

Arnold Machinery is located at 433 West Second St., South, Salt Lake City.

Mobil Dealers Convention At Las Vegas Nov. 17-18

LOS ANGELES—Nearly 1,000 petroleum retailers and wives from the West Coast Marketing Div. of Mobil Oil Co. will attend the 1960 dealer convention at Las Vegas, November 17 and 18.

The program will include panel discussions and exhibits will occupy 8,000 sq. ft. of the convention center. Suppliers will show the latest advances in station equipment.

New Solar Test Facility At GE's Phoenix Plant

PHOENIX—A new facility, for testing static solar-powered generating systems for space use, is being erected next to General Electric Co.'s Computer Dept. plant in Deer Valley.

The test facility will be operated by GE's Missile and Space Vehicle Dept. with headquarters in Philadelphia. Construction began Nov. 1 on the two-section 57 x 35-ft. building which will be sizable enough to test the largest solar-powered generating systems presently being built for space applications. Initial test operations are scheduled to begin next February with a staff of about five persons.

The facility will include solar collectors as large as 21 ft. in diameter. These saucer-shaped collectors are large parabolic mirrors with surfaces that reflect sun rays into a reduced area thereby providing a concentration of heat used for generating electrical power.

GE is currently engaged in research to achieve efficient power systems using solar collectors for space satellites, according to Richard W. Karchar, manager of GE's Vehicle Electrical Power and Distribution organization.

Officials of GE said that Arizona weather was the main reason for selecting the Deer Valley site. Phoenix has an average of 210 clear days per year compared to 94 clear days for Philadelphia.

Four Firms Acquired By Houston Fearless

LOS ANGELES—Noah Dietrich, board chairman of Houston Fearless Corp., here, has announced completion of the acquisition of 100 per cent of the common stock and all assets of four companies in the electronics and related industries.

The acquired companies are: Nuclear Research Instruments, Berkeley, Calif.; Parabam, Inc., Hawthorne, Calif.; Allen Research and Development, which recently moved into its new plant at Buena Vista, Calif., and Uniconn, Inc. of Plymouth, Conn.

This expansion, Dietrich said, moves Houston Fearless into the fields of gyroscope design and manufacturing, nuclear instrument systems, ground support equipment, and digital data systems for military and industrial use.

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... for more details, circle No. 57 on Reader Service Postcard

Yale & Towne Sponsors Unit Load Demonstration



Loading a section of a special railroad car by the unit load method. Note floor of car. Tines of lift truck fork fit between spaces on floor, so that palletless load can also be picked up by fork truck. Not shown here are special steel bases somewhat similar to car floor on which unit load may be stored. Bases unlike pallets remain on floor when load is picked up.

ALAMEDA, CALIF.—A demonstration of the new Unit Load System was recently held at Alameda Terminal Warehouses. Sponsored by Yale & Towne Mfg. Co., the demonstration included a special Unit Load freight car, Unit Load conversion bases and Yale lift trucks fitted with special forks.

The Unit Load System is a system designed to integrate the mechanical handling and transportation of a product in unit loads from the point of manufacture clear through to the point of ultimate distribution. Its use will provide significant savings both to shippers and carriers.

Pallets are eliminated by the System. Instead cartons are stacked on conversion bases, light high tensile strength steel bases weighing 74 lbs. The bases are corrugated in widths of approximately 1½-in. Thus when the specially matching tines on a fork lift truck are inserted they fit perfectly under the load and lift it, leaving the conversion base on the floor. Bases can be moved by lift trucks to another place merely by placing the tines through the closed area of the corrugation.

Unit Load Corp. has developed a special freight car, having six separate compartments which open on the side of the car. Compartments, and

in fact the whole Unit Load System, are based on a load size of 40-in. by 48-in. deep. This has been proven by tests to be an almost universally accepted load size and many firms have already standardized on it. The floors of the compartment are corrugated so that loads can easily be placed on them and removed without use of a pallet. Four loads are placed in each compartment.

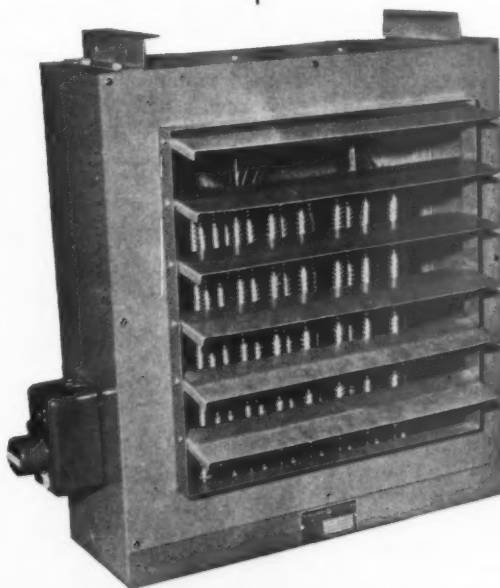
The demonstration was held because a special Unit Load rail car was avail-

able. It is currently being used to provide them with information on how well the System eliminates damage. According to Addison Brown, chairman, Unit Load Corp., "The elimination of damage by the Unit Load invention offers tremendous savings to the participating railroads." Lew Goldenson, branch manager, Yale & Towne Mfg. Co. stated that his firm was sponsoring the demonstration in the interest of good material handling and was one of a number of material handling equipment manufacturers participating in the Unit Load System.

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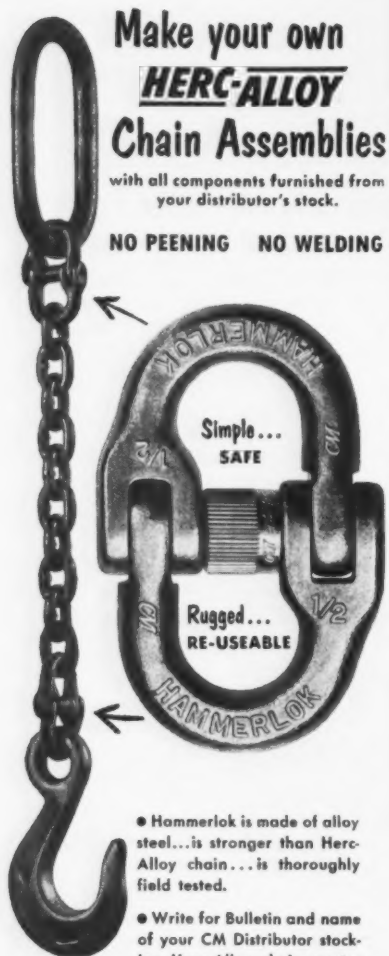
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96

General Dynamic's Helium Hauling Tube Trailer



LOS ANGELES — Fruehauf Trailer Co. has recently completed the construction of two highly unique trailers. The first, pictured, is a helium hauling tube trailer that weighs only 800 lbs. more fully loaded than empty. The second is a carbon dioxide semi-tanker with adjustable front coupler and adjustable tandem underconstruction. Both trailers were built for General Dynamics Corp., Liquid Carbonic Div.

The helium trailer is made up of a Fruehauf tandem axle semi-chassis and 66 twenty-four ft. tubes which carry the payload. The trailer hauls 114,000 cubic feet of helium, with pressures exceeding 2,000 lbs., from Amarillo, Texas, to Liquid Carbonic's plant at 5700 South Alameda St., Los Angeles.

The carbon dioxide semi-tank trailer is used by General Dynamics for liquid CO-2 delivery on the West Coast. The trailer's single sphere tank has 6 in. of insulation to keep its contents from rising above 0°. Although the tank is the largest possible size commensurate with safety, and also elaborately constructed to handle the liquid's 250 to 260 lbs. of loading pressure, it is extremely light weight, allowing maximum payload.



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... for more details, circle No. 64

Ziegler Steel Service Takes Over Fabrication Facilities

NORTH HOLLYWOOD, CALIF. — Herbert Ziegler, president, Fabricated Steel Service, Inc., has announced the closing of manufacturing facilities at 7400 Laurel Canyon Blvd., here, in order to devote all of the facility to the distribution of steel and non-ferrous metals.

The space will be taken over by Ziegler Steel Service's North Hollywood branch, who have recently installed plate flame cutting and shearing equipment. A saw for cutting roof deck to exact length has been put into operation.

Ziegler plans to broaden their line of steel and aluminum products in order to better serve the San Fernando Valley and adjacent areas.

AiResearch Expanding Phoenix Facilities

PHOENIX—AiResearch Mfg. Co. has announced the expansion of its manufacturing facilities here and the purchase of additional land.

Construction will begin soon on a 28,000 sq. ft. addition to the south side of the main manufacturing area adjacent to Sky Harbor Airport. Cost of the building will run about \$400,000. AiResearch has also acquired most of the land along 36th Street adjacent to and on the east side of the company's test facilities.

Company officials said the expansion will consolidate certain outside leased areas and provide for future growth. With the completion of the new building, AiResearch will have more than 680,000 sq. ft. of work area under roof and approximately 95 acres of land.

Fernholtz Adds Three Lines of Equipment

LOS ANGELES—The Fernholtz Machinery Co. has announced gaining exclusive Western representation for the products of three manufacturers of industrial equipment.

The three firms Fernholtz will represent are: Kent Air Tool Co. of Kent, Ohio, manufacturers of a line of paving breakers, clay diggers, tampers and rock drills; Bonnot Co., Canton, Ohio, builders of processing equipment for the ceramic, chemical, mineral and steel industries; and Cleveland Mixer Co., Cleveland, makers of wet and dry mixing equipment for the chemical process industries.

Fernholtz Machinery Co. headquarters are located at 8468 Melrose Pl., here.

Weaver Elec. To Build New Denver Facilities

DENVER—Weaver Electric Co., established in 1910, will build a \$250,000 office and shop building on newly acquired property at E. 66th Ave. and N. Washington Blvd.

The firm paid \$26,000 for three acres of industrial ground on which will be built a 50,000 square foot structure to house 10 office and sales personnel and over 20 shop employees.

The company handles new and rebuilt electrical motors, generators, transformers and compressors.

Contract to Electrada For "Thinking" File

LOS ANGELES—Enormous file systems which "think for themselves" may be the result of research undertaken by the Electrada Corp. for the *National Science Foundation*.

A \$68,400 contract for an exploratory study into file organization which will permit great masses of scientific information to be sorted, classified and made available by the file itself, has been awarded to Advanced Informa-

tion Systems Co., a subsidiary of Electrada Corp., Beverly Hills, Calif.

The contract, announced by Electrada President *Homer H. Rhoads*, is part of a master plan for improving the dissemination of scientific information in the United States. In 1958, Congress gave the NSF the task of developing new and improved methods for making the world's rapidly growing store of scientific information available to American scientists and engineers. Previous contracts generally went to colleges and universities.



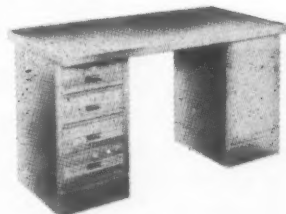
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Eastman Pacific Named Perfecting Service Rep

LOS ANGELES — A. J. DeMeyer, vice president in charge of sales for Perfecting Service Co. of Charlotte, No. Carolina, has announced the appointment of the Eastman Pacific Co., here, as West Coast distributor.

Eastman Pacific will distribute the complete line of quick couplers and air control equipment manufactured by the Perfecting Service Co.

Ken Cannon is president of Eastman Pacific which was established here in 1938 and is located at 5240 Alhambra. The firm also serves as distributors for Eastman Mfg. Co., Flexaust Co., and Circle Clamp Corp.

Walla Walla Firm Plans Spokane Unit

SPOKANE, WASH.—The Blue Mountain Ro-Tile Co., which opened a manufacturing plant last year at Walla Walla, has announced plans to expand its distributing network into Spokane and will open an office and warehouse here.

Specially developed automatic equipment is used by the Walla Walla firm to manufacture colored concrete shingles for roofing. LaVor C. Thompson, vice president of National Ro-Tile of Boise, Ida., the parent firm, will oversee the start of operations here.

U. S. Steel Expanding Phoenix Installation

PHOENIX — A 23-acre tract was set upon by a groundbreaking crew from U. S. Steel Corp.'s Consolidated Western Steel Div. to make way for a new and modern plant. It will replace the old facility which started in 1918 on a 2½ acre plot, spreading out to 10 acres.

The new plant will have four major production buildings and a separate office building for sales, engineering, design and administration. Construction is scheduled to be done early next year.

Participating in the groundbreaking ceremonies were A. E. Djerf, manager of the southwest district of Consolidated Western; Phoenix Mayor Sam Mardian, Jr.; Joseph A. Chambers, chairman of the Phoenix Chamber of Commerce Industrial Committee; and William Venable, president of Local 3436, United Steelworkers of America.

"Transfer of the manufacturing facilities," said Djerf, "would take place gradually, and the new site and expanded facilities would allow for better service throughout the southwest."

Designed by Consolidated Western engineers, the plant's production area will be augmented by considerable outside working and storage space. Consolidated Western will act as prime contractor. Fisher Contracting Co., Phoenix, received contract for founda-



Joseph A. Chambers, left, chairman of the industrial committee of the Phoenix Chamber of Commerce, and A. E. Djerf, manager of the Southwest District of U.S. Steel's Consolidated Western Steel Div., break ground for the firm's modern fabricating plant on a 23-acre site in West Phoenix.

tion work.

A receiving and fabrication building will be serviced by two trucking companies and a new spur line to be laid by Southern Pacific. A culvert shop will be constructed along the spur, and a plate casing line for the manufacture of water well casing from steel plate will be erected next to the shipping end of receiving.

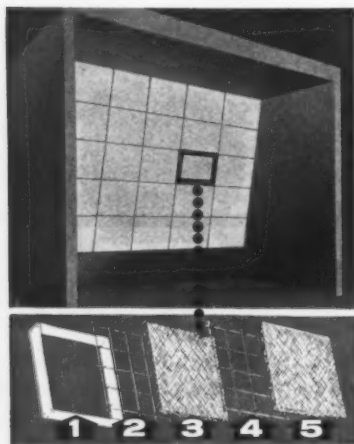
Consolidated Western provides services for the design, engineering and fabrication and erection of various products from plate, sheet and light structural steel. Storage space will enable the firm to keep standard products, such as water well casing, gasoline and water storage tanks and other stock available for immediate delivery.

Shell Torrance Boosts Rubber Plant Production

TORRANCE, CALIF.—A boost in production of 40,000,000 pounds annually has been made at Shell Chemical Co. facilities here that are making polyisoprene type rubber that has similar properties to natural rubber.

According to C. S. Williamson, plant manager, expansion of the polyisoprene line has created about 150 jobs at the Torrance plant, raising the work force to nearly 1300 employees.

According to Shell spokesmen the synthetic rubber can compete with natural rubber in many applications that before were monopolized by the natural product.



♦ A Paint Arrestor module consists of a Holding Frame (1), two Snap-in Grids (2 and 4), two Paint Arrestors (3 and 5). Loaded Paint Arrestors are simply replaced as necessary. And, they're also ideal for air-borne ink, mist, dye, frit, etc.

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The advantages of R P Paint Arrestors, the inexpensive, disposable air filters are many. Overspray solids are trapped before they reach the exhaust stack...to reduce fire hazards, damage to adjacent property...disagreeable and time-consuming maintenance work. Installation? —easy and fast. Maintenance? —remove loaded Paint Arrestor and replace a new one. Adaptability? —ideal for any type, any size booth, new or existing.

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• SACRAMENTO (GI 1-3796)

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Aircraft Industry Gets Big Contract

LOS ANGELES—Western aircraft firms are viewing with interest the recent Defense Department announcement that North American Aviation has been authorized an additional 110 million dollars for expansion of the B 70 Bomber program. The program has long been the center of a dispute on whether or not missiles are ready to take over from manned aircraft. The November 1 announcement is seen by many as a sign that the mixed force concept (planes as well as missiles) is being adopted. If such is the case, other aircraft firms besides North American stand to receive government contracts.

This comes at a time when the Western aircraft industry has reached a low ebb, with aircraft plants either operating on limited schedules or shut down completely. That industry however in recent years has followed a policy of diversification and many firms have gone into production of missiles, electronic items and other

Report Western Use of Steel Mill Products

OAKLAND, CALIF.—The market for steel mill products during 1959 in the seven Western states was up 12% over 1958, according to the annual "Report to Far Western Steel Purchasers" published by Kaiser Steel recently. The report is compiled from information supplied by the steel-using industries in California, Washington, Oregon, Utah, Arizona, Nevada and Idaho.

Western receipts of 6,216,000 tons approached a record, despite the 116-day steel strike beginning in mid-July.

Distribution of the tonnage within the 7-state region detailed in the report shows that California consumers accounted for more than three-quarters of the total tonnage, 42% of which went to Southern California and 34% to Northern California. Oregon and Washington accounted for 15%, and the four remaining states received 9%.

The 1959 market increase, while averaging 12% overall, was marked by a 21% increase in the Washington-Oregon share, primarily because of a strong demand for plate, bars, and hot-rolled sheet.

things. Despite this diversification, increased production of aircraft would be a welcome shot in the arm to the industry.

On the North American contract alone some 3,000 additional workers will be needed by 1962, although no additional personnel are expected to be added immediately. Recently added 110 million dollars brings the total 1961 authorization for the bomber to 265 millions.

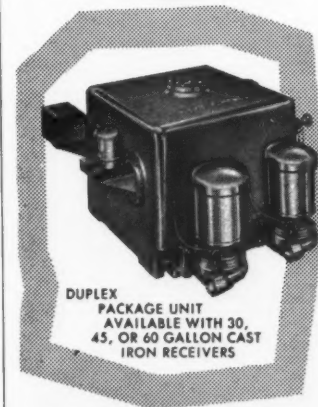
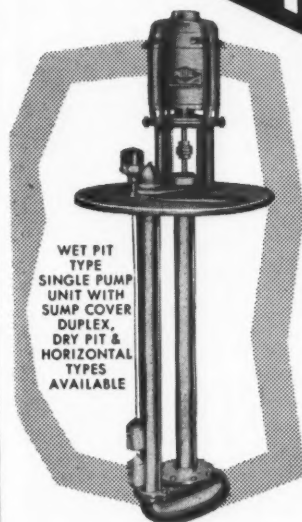
Tharco Containers Expands Facilities

OAKLAND, CALIF.—Expansion of plant space and fabricating equipment was announced recently by Tharco Containers, here, designer and manufacturer of corrugated shipping containers.

H. W. Aitchison, president, said, "An additional 20,000 sq. ft. of warehouse and manufacturing space and the purchase of a new die cutting unit and a 60-inch laminator permit us to stock more materials and provide our customers a more flexible design."

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Features PUMPS FOR INDUSTRY



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THOUSANDS OF PACIFIC NON-CLOG pump installations handle industrial wastes, heavy fluids, liquids containing solids, refuse and pulp. Available in special metals for handling products of canneries, breweries, food, and other processing plants. Send for Bulletins 1850 series.

CONDENSATE AND BOILER FEED UNITS

WIDE RANGE OF SIZES AND TYPES conform to latest ASVHE recommendations, for vertical, elevated or floor level installation. ReturnZall package units (illustrated) are complete package units, with square cast-iron receiver, bronze fitted centrifugal pumps (type GR), standard heavy-duty NEMA motor and float controls. For complete information send for Series 1700 bulletins.

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PG&E Harnesses Natural Steam to Produce Power



Pacific Gas & Electric Co. pipeline at The Geysers in Sonoma County Mountains of California gather natural steam freed from caverns and crevasses deep in the earth by wells drilled into them. Thermal and Magma power companies developed the wells in 1955, 1957 and 1959.



Steam is carried over the hill a quarter mile to PG&E's \$2,000,000 geothermal power station where it jets against turbine blades, spinning out electricity. The plant has a capacity of 12,500 kilowatts, sufficient to produce all the electricity required by a community of 20,000.



PG&E President Norman R. Sutherland at recent dedication ceremonies said "The enterprising men who kept coming here over the years were determined that this natural heat energy could be put to work, and they kept at it until they proved they were right."

THE GEYSERS, CALIF.—Pioneering the use of natural steam from within the earth to generate electric power, Pacific Gas & Electric Co. officials and industry and government representatives dedicated America's first geothermal plant here last month.

Development of The Geysers for commercial power production has been studied for many years but never proved practical until the project now completed was undertaken three years ago by engineers of PG&E and the Thermal and Magma power companies. PG&E started work on the \$2,000,000 project last August.

Geologists who have studied The Geysers say they are not geysers, but steam fumaroles, they explain that part of the natural steam is formed by moisture from "magma," the molten mass deep in the earth, and is emitted through subterranean fissures. Additional steam is formed by water from the earth's surface percolating down through previous rock to deeper rock formations heated by the magmatic steam.

The turbine uses about 240,000 lbs. of steam per hour. It reaches the well heads from within the earth at a pressure of about 115 lbs. per sq. in. and has a pressure of 100 lbs. when it strikes the turbine. Its temperature is about 350 degrees F.

As it is not necessary to recover the condensed steam after its energy is spent in the turbine, as in a gas or oil fueled plant, a less expensive barometric type condenser is used wherein the spent steam and cooling water are mixed. Then the mixture is pumped across the road to a cooling tower where it is cooled by evaporation. The system produces more water than it uses.

To overcome the problem of removing solid particles such as minute fragments of rock from the steam, Magma and Thermal power companies installed centrifugal "cleaners" at each wellhead. These cleaners spin out these particles which would wear and damage the turbine blades.

One of the most difficult problems overcome in the design of the plant was the corrosive characteristics of the natural steam. Extensive testing revealed that carbon steel was essentially useless, but stainless steel alloys were found capable of withstanding the corrosion.

Two New Distributorships For Van Waters & Rogers

LOS ANGELES—Alert Supply Co. has announced the appointment of Van Waters & Rogers, Inc., with offices and warehouses at Seattle and Spokane, Wash.; Portland, Ore., and Boise, Idaho, as its distributor in the Washington-Oregon-Western Idaho territory.

"Van Waters & Rogers' background in chemical and other sales makes them ideally suited to handle the wide line of Alert and Hanson-Van Winkle-Munning Co. metal finishing supplies and equipment," said A. E. Perkins, president of Alert Supply.

Alert is a wholly-owned subsidiary of Hanson-Van Winkle-Munning Co. of Matawan, N. J.

Major Addition For Waterways Terminal

PORTLAND—Plans for construction of a major addition to Waterways Terminal Co.'s warehouse on the left bank of the Willamette River in north-west Portland have been prepared by the engineering department of Crown-Zellerbach Corp., in Seattle, parent firm of Waterways.

It is estimated that the addition would cost \$1,000,000. The tentative plans call for some 321,046 sq. ft. of floor space to be added to the big asphaltic storage building at 3838 N. W. Front Ave. Also, some 405 by 180 ft. of asphaltic concrete yard paving are planned.

Mechanex Occupies New Englewood Facilities

ENGLEWOOD, COLO.—Mechanex Corp., developer of wheel oil seals for commercial trucks and trailers, has completed its latest move to a new multi-building plant here.

The facilities include a complete rubber plant, metal casting foundry, research, engineering and general production plant as well as modern offices.

New Office, Warehouse For Clark Controller

SAN FRANCISCO—J. J. Belock, district manager for the Clark Controller Co., has announced the opening of new office and warehouse facilities at 1770 Yosemite Ave., here.

The larger quarters will enable the company to carry complete stocks of motor control apparatus.

Ease the profit squeeze



with a **PAYLOADER**®

Brighton Electric Steel Casting Company reports the H-25 "PAYLOADER" improves operations several ways:

1. Provides more efficient mechanized handling for several different jobs.
2. Operates fast and effectively in close quarters.
3. Operator efficiency sustained during the full shift because of easy operation.
4. Maintenance is low in spite of hard usage.

Brighton Electric Steel Casting Company, Beaver Falls, Pa., makes piercer points for the seamless steel tubing industry, and has earned a fine reputation for uniform high quality and precision workmanship in this specialized field. Its decision to acquire a Model H-25 "PAYLOADER" has proved to be a wise one. This tractor-shovel has brought new efficiencies to their overall operation since it took over several sand-handling and castings-handling duties.

Efficient and Reliable. Foundry Foreman, Thomas Gillingham, says, "The H-25 'PAYLOADER' has many features that definitely increase foundry efficiency. One of these is close-area maneuverability. The operators claim ease of operation with accurate control of material load. It has rugged construction that stands up continuously under rough working conditions with simple maintenance."

Superior Mechanical Features. Speed, capacity, maneuverability and ease of operation are combined in the H-25 for big production all day long—thanks to 2,500-lb. operating capacity, power-shift transmission, torque converter drive, power-steering, power-transfer differential and fast, powerful hydraulic bucket control.

A Size for Every Job. For any bulk-handling job, indoors or outdoors, there is a proven "PAYLOADER"—up to 12,000 lbs. operating capacity. A nearby Hough Distributor is ready to show you how a "PAYLOADER" can "ease the profit squeeze". Return the coupon, or write:

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W. C. McCammon
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A. F. Kelsey
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G. K. Bogert
Wilkerson Corp.



W. J. Baird
Goodrich Industrial



James Thackrey
Pacific Scientific



R. D. Becker, Jr.
American Liquid

■ **James M. Hait** is newly elected president of Food Machinery & Chemical Corp., San Jose, Calif.

■ **William C. McCammon** has been named vice president, supply and transportation, Standard Oil Co. of California, Western Operations, Inc., San Francisco.

■ **Alan F. Kelsey** has been appointed assistant to the president, Soule' Steel Co., San Francisco.

■ **William O. Hall** has been appointed chief engineer, C. A. Norgren Co., Englewood and Littleton, Colo.

■ **G. Keith Bogert** has been named manager of manufacturing, Wilkerson Corp., Englewood, Colo.

■ **Walter J. Baird** has been named Los Angeles area sales representative, sundries division, B. F. Goodrich Industrial Products Co.

■ **James Thackrey** has been named manager, New Product Engineering Dept., Aeronautical Div., Pacific Scientific Co., Bell Gardens, Calif.

■ **Robert D. Becker, Jr.**, has been appointed vice president, Carburetion Div., American Liquid Gas Corp., Los Angeles.

■ **Lawrence M. Weitzel**, president of Mechanical Specialties Co., Los Angeles, has been appointed a member of U. S. Trade Mission to France.

■ **Dr. Remo Pellin** has joined Motorola's Semiconductor Products Div. as product manager, semiconductor materials, Phoenix.

■ **Lloyd C. Graham** is newly appointed Western regional sales manager for Devcon Corp.

■ **Norman A. Klemp** has been named vice president, Pacific Moulded Products Co., Los Angeles.

■ **Kenneth B. Sharpe**, executive vice president, Sharpe Mfg. Co., has been elected president, National Spraying Painting and Finishing Assoc.

■ **William H. Borman** has been named manager, customer relations, Automation Industries, Inc.'s Northwest sales division, Redwood City, Calif.

■ **Henry C. Jones** has been named executive vice president and director of operations, Electrada Corp., Beverly Hills, Calif.

■ **Edward C. Buurma**, Palo Alto, Calif., has been appointed Northwest regional manager, Government and Industrial Group, Philco Corp.

■ **Leon H. Bates** is newly named plant manager, Tractor Loader Div., Eimco Corp., Salt Lake City.

■ **Kurt F. Vogt** has been named vice-president — marketing, Acoustica Associates, Inc., Los Angeles.

■ **John E. Krickl** is newly named Western District sales manager, Lindberg Engineering Co., Downey, Calif.

■ **Richard L. Franklin** has been appointed industrial relations manager, Los Angeles facility of Servomechanisms, Inc.

■ **James A. Ross** has been promoted to equipment division manager, Computer Engineering Associates, Inc., Pasadena, Calif.

■ **John A. MacPherson** has been appointed to an engineering sales post by Kinetics Corp., Solana Beach, Calif.

■ **Donald L. Driscoll** is new director of marketing for American Avionics, Inc., at Los Angeles.

■ **John P. Rudow** has been appointed Northwest district manager at Portland for Smith Engineering Works.

■ **Harry R. Gillespie** is newly named assistant general manager, Trimpot Div., Bourns, Inc., Riverside, Calif.



Cecil Milne
Fabriform Metal



W. R. Reilly
Fornaciari Co.



H. A. Curwen
Earle M. Jorgensen



R. A. Warfield, Jr.
CF&I



Peter Colefax
American Chemical
& Potash



J. L. Choice
Lamson Corp.



W. F. Gulley
Rockwell Mfg.



Hugh Richmond
Hyster

■ **Cecil Milne** has joined Fabriform Metal Brazing, Los Angeles, as a member of the sales staff.

■ **William R. Reilly** is newly appointed sales engineer for Fornaciari Co., Los Angeles distributor of construction and hydraulic equipment.

■ **H. A. Curwen**, technical director, Earle M. Jorgensen Co., Los Angeles, has been named convention chairman, 12th Western Metal Congress.

■ **Ray A. Warfield, Jr.**, has been named senior product supervisor, Quality Control Dept., Colorado Fuel & Iron Corp., Pueblo, Colo.

■ **Peter Colefax**, president of American Potash & Chemical Corp., has been named Chairman of the Board by the directors.

■ **Jack L. Choice** has been named divisional manager, industrial sales, Lamson Corp., Western Div., San Francisco, to cover 10 Western states, Alaska and Hawaii.

■ **William F. Gulley** is newly named assistant regional manager, Western region, for Rockwell Mfg. Co., Meter & Valve Div., San Francisco.

■ **Hugh Richmond** has been appointed supervisor, Special Products Engineer-

ing Dept. in Portland and Danville, Ill., for Hyster Co.

■ **Richard M. Zemke** has been elevated to manager of purchases and traffic, Westinghouse Electric Corp.'s manufacturing division, Sunnyvale, Calif.

■ **Harry Czyzewski**, president Metallurgical Engineers, Inc., has been appointed to Radiation Advisory Committee, Oregon State Board of Health.

■ **Irvine F. Williamson** has been appointed superintendent, Norton Co.'s Santa Clara, Calif., plant.

■ **George D. McDonald** has been named general manager, operations and sales, Berry Foundry, Sacramento, Calif.

■ **Floyd Quinn** has been appointed general manager, Pacific Shore Sales & Repair Co., Inc., the manufacturing arm of the Select Pallet Co., Los Angeles.

■ **Hugo Klein** has been named chief engineer, Lit-Ning Co., Fresno, Calif., and Fremont, Ohio.

■ **William P. Lear**, founder and Chairman of the Board of Lear, Inc., was recently awarded the "Great Silver Metal" of Paris.

■ **Robert W. Kerr** has resigned as president and director of Fairbanks, Morse & Co., to become president of Fluor Products Co., Los Angeles.

■ **Frank G. Marble** has joined Syston-Donner Corp., Concord, Calif., as assistant to the president.

■ **Roland M. Caldwell**, electrical engineer, has joined Reynolds Metals Co., Los Angeles, to serve engineering, design and construction departments.

■ **Howard Arnett** has been named manager domestic power reactor sales for GE's Atomic Power Equipment Dept., San Jose, Calif.

■ **Robert H. Hadfield** is new director of marketing, Raymond Atchley, Inc., West Los Angeles.

■ **Dale M. Nevitt** has been appointed vice president of manufacturing, Western Design, Div. of U. S. Industries, Inc., Goleta, Calif.

■ **Joseph N. Kelman**, Los Angeles, founder of the Kelman Electric & Mfg. Co., now a division of I-T-E Circuit Breaker Co., passed away recently.

■ **Earl H. Miller**, resident manager, U. S. Borax & Chemical Corp., Carlsbad, N. M., has been elected to board of governors, Western Div., American Mining Congress.

■ **Charles E. Hinman** has been named resident manager, Bemis Bros. Bag Co. plant, Fullerton, Calif.

■ **Edward P. Escher**, vice president and director of Screw Conveyor Corp., Santa Clara, Calif., passed away recently.

■ **Dudley Tower** has been elevated to president, Union Oil Co. of California, Los Angeles.

■ **D. J. Benjamin**, vice president packaging, and **W. J. Zellerbach**, vice president marketing services, Crown Zellerbach Corp., San Francisco, have been elected to Board of Directors.

■ **L. R. Larson** has been appointed Portland district sales manager, Pacific Intermountain Express.

■ **Charles M. Edwards** has been appointed Western corporate representative, Bendix Corp., Burbank, Calif.

Contract News for the West

The U. S. Army Ordnance District, Los Angeles, with headquarters at 55 S. Grand Ave., Pasadena, announced Oct. 14 the award of over \$2,000,000 in Army Ordnance contracts to the following contractors:

Harvey Aluminum, Torrance, Calif., \$317,713 for cartridge cases; \$119,451 for production engineering and \$69,004 for research and development.

Sperry Utah Engineering Laboratory, Salt Lake City, \$205,294 for Sergeant missile ground handling and test equipment, and \$26,128 for Sergeant missile system training material.

Douglas Aircraft Co., Inc., Santa Monica, Calif., \$159,116 for Nike missile repair parts and launching area items.

Whittaker Gyro, Div. Telecomputing Corp., Van Nuys, Calif., \$148,493 for gyro maintenance.

Eidal Mfg. Co., Inc., Albuquerque, \$121,076 for trailer chassis.

Gilfillan Brothers, Inc., Los Angeles, \$115,646 for Nike missile system components.

California Institute of Technology, Pasadena, Calif., \$100,000 for wind tunnel research.

Convair, San Diego, \$95,990 for a ballistic missile defense system feasibility study.

Aerojet-General Corp., Downey, Calif., \$90,542 classified.

Associated Aero Science Labs, Hawthorne, Calif., \$89,435 for civilian technical assistance at Redstone Arsenal, Ala.

California Computer Products, Inc., Downey, \$85,293 research and development for automatic vehicle check-out system.

Norris-Thermador Corp., Vernon, Calif., \$71,641 for cartridge cases.

Firestone Tire & Rubber Co., Los Angeles, \$58,900 for Corporal missile system repair parts and components.

Nortronics, Div. Northrop Corp., Hawthorne, \$48,447 for production engineering services.

Radioplane, Div. Northrop Corp., \$47,000 for target missile production.

U. S. Steel Corp., Consolidated Western Steel Div., Los Angeles, \$37,000 for motor case assemblies.

Atlantic Research Corp., U. S. Flare Div., Saugus, Calif., \$36,475 research

and development for illuminating shells.

Motordyne, Inc., Monrovia, Calif., \$31,290 for motor generators.

Autonetics, Div. North American Aviation, Inc., Downey, \$31,000 for a field artillery digital automatic computer.

Other contract news reported to WESTERN INDUSTRY during October include the following:

Lockheed's California Div., Burbank, \$53,000,000 for additional Turboprop P3V-1 anti-submarine warfare planes from U. S. Navy.

Ramo-Wooldridge, Div., Thompson Ramo Wooldridge Inc., Canoga Park, Calif., over \$25,000 for computer development from U. S. Navy.

Transval Electronics Corp., El Segundo, Calif., more than \$1,000,000 for new four-wheel "snow buggies" from Army Transportation Corp. and \$881,370 for construction of 36 giant trailers from Army Transportation Materiel Command.

Osborne Electronic Corp., Portland, \$172,934 for transformers from U. S. Air Force.

Packard Bell Electronics, Los Angeles, \$850,000 for field communications equipment from U. S. Army Signal Supply Agency, Philadelphia.

Telecomputing Corp., Los Angeles, \$2,000,000 follow-on from Western Electric Co., Winston-Salem division, for guidance and control gyros for the Nike Hercules. *Whittaker Controls Div.* of Telecomputing, \$250,000 from Republic Aviation for components to be used on Air Force F-105 fighters and \$85,000 from Pesco Products for fuel valves.

Gladding, McBean & Co., Los Angeles, \$200,000 further production of ceramic radomes for Sparrow III missile from Raytheon Mfg. Co.

Aerojet-General Corp., Azusa, Calif., a contract for Ablestar second-stage boosters from Air Force Ballistic Missile Center. Amount of contract was not reported.

Space Electronics Corp., Glendale, Calif., an extension of nearly \$1,000,000 to its subcontract with Aerojet-General for development of electronic and electrical systems for the Air Force Ablestar second stage booster.

Garrett Corp.'s AiResearch Mfg. Co., Los Angeles, a contract for an undisclosed number of 2.5 ton vapor cycle air conditioning packages from Electronic Div., Westinghouse Electric Corp. Value of initial order was placed at over \$150,000.

Traid Corp., Encino, Calif., \$25,000 from Wright Air Development Headquarters, Dayton, Ohio, for photographic instrumentation systems. Also \$100,000 from Pan American World Airways for high-speed cameras.

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are 1/8 inch short of contracted space to allow for borders and composition. Rates are \$16.00 a column inch. Copy should be sent in by the 20th of preceding month if proofs are required; by the 25th if no proofs are required.

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Roll forming sales, experienced, knowledge of California markets required.

Good income plus benefits.

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Experienced with electric utility control systems. Man we want probably has 5-10 years experience designing control systems for a large public utility. Excellent opportunity to associate with engineering department of well established company manufacturing electronic supervisory control systems. Applicants should write to or call D. L. Oestreich, Lynch Communication Systems Inc., 695 Bryant Street, San Francisco 7, California. Telephone EXbrook 7-1471.



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personalize your volume mailings!

The impact of a personal typewritten letter is well known, but heretofore these letters in large quantities have been impractical to produce. Now MAILWAYS INC. through use of tape, can volume process your letters ... effectively and economically.

MAILWAYS INC. *--- YUkon 2-2524
*also quality printing & engraving

Union Oil Co. Plans New Portland Building

PORTLAND—J. E. McCaffrey, Oregon division manager for the Union Oil Co. of California, has announced plans to construct a new office building here that will cost about \$600,000 covering building, land and other improvements.

The three-story structure will be located at S. W. 18th Ave. and Madison St.

McCaffrey said that the company decided to build in Portland after a firm of management consultants surveyed the city and indicated Portland would improve its position as business center of the Northwest.

Globe Hoist Film Shows Oil-Hydraulic Ram Uses

LONG BEACH, CALIF.—Globe Hoist Co. has prepared a new 15 minute sound slide film entitled "How to Harness a Ram", which describes the use of hydraulic power in such jobs as handling rolls of paper, raising boxes from the floor to the bed of a motor carrier, and performing over 100 different jobs of lifting, loading, positioning and material handling.

Showings of the film will be made to plant executives and others who specify or purchase material handling equipment. For information on how to arrange a showing contact Robert Phoenix, Globe Hoist Co., 1461 Canal Ave., Long Beach 13, Calif.

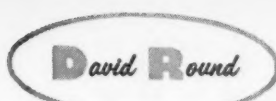
Name Change Reflects Scope of Columbus McKinnon Line

SAN FRANCISCO—The Columbus McKinnon Chain Corp. has changed its name to make it more representative of the products produced by its several divisions, according to Arthur Luchs, Pacific Coast regional sales manager.

The word "Chain" has been dropped so that henceforth the firm will be known as the Columbus McKinnon Corp.

Divisions of Columbus McKinnon Corp. include the Chain Div., producing automotive and industrial chains; the Chisholm-Moore Hoist Div., manufacturers of hand and electric hoists; the Conveyor Div. which makes power and free conveyor systems; and the Mining Equipment Div., manufacturers of shuttle-to-belt feeders.

Main offices of Columbus McKinnon Corp. are in Tonawanda, N. Y.



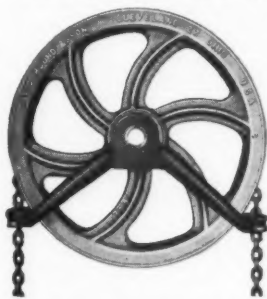
POCKETED
CHAIN

SHEAVES

AND
CHAIN
GUIDES

Perfect Fitting Welded Chain For All Sizes

For light mechanical operation or heavy load control service



Light Duty Sheave No. 7-4
Chain Guide No. 7-4
Chain No. 120



Heavy-Duty Sheave No. PO-2
Chain No. 132-5

Sheaves are supplied either with solid hub or bored and key-seated to specification.

Write for Bulletin 775H1

District Representatives: Calif., Berkeley—Fletcher Sales, 2300 Fourth St. Los Angeles—Hoist Specialties, Inc., 429 So. Western Ave., Oregon, Portland—B. P. Rutherford, Inc., 122 S.W. First Ave., Wash., Seattle—B. P. Rutherford, Inc., 1954 First Ave. So.



Chain Hoists • Electric and Air Hoists & Winches
Cranes • Sheaves & Chain

DAVID ROUND & SON, INC., CLEVELAND 39, OHIO

... for more details, circle No. 65 on Reader Service Postcard

LAST 3 TIMES LONGER, PUMPING ABRASIVE LIQUIDS



Left to right are shown: R. W. Delaney, General Foreman of Maintenance of the Westinghouse Mansfield plant; C. N. Greene, Tuller Corporation, Columbus, Ohio and W. O. Hale, Paint Lab. Foreman of Westinghouse, inspecting one of two rows of Viking paint pumps.

WESTINGHOUSE Electric Corporation's major appliance plant at Mansfield, Ohio has materially reduced the problem of pumping abrasive type coating materials, according to Mr. C. Reining, Manager, Works Engineering. **VIKING'S** new abrasive liquid **PUMPS** are the answer, working 24 hours a day, 7 days a week. These new pumps are lasting three times longer than any previous equipment and still going strong. Pressures range from 45 to 95 PSI. Of the 28 **VIKING PUMPS** handling paints, primers and finish coatings in the Westinghouse Mansfield plant, 12 are the latest type of **VIKING** abrasive liquid construction. The other 16 will be replaced with new type **VIKINGS**.

Have an abrasive liquid pumping problem at your plant? Profit by this Westinghouse experience! Install new **VIKING PUMPS**, with ceramic bearings and mechanical seals, especially designed to handle abrasive liquids and provide long pump life. When writing please give this information: 1. Liquid pumped, 2. Viscosity of liquid (SSU), 3. Percentage and type of solids present in liquid, 4. Temperature of liquid, 5. Specific gravity, 6. Capacity of pump, 7. Suction lift or head, 8. Discharge pressure ... and ask for bulletin SP-507A. **VIKING PUMP COMPANY**, Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" PUMPS. (*Consult factory for recommendations on pumping abrasive liquids other than paints and inks.) Pacific Coast Distributors: Viking Pump Co. of Los Angeles, 4432 Long Beach Ave., Los Angeles, Calif.; De Laval Pacific Co., 201 E. Millbrae Ave., Millbrae, Calif.

... for more details, circle No. 66 on Reader Service Postcard

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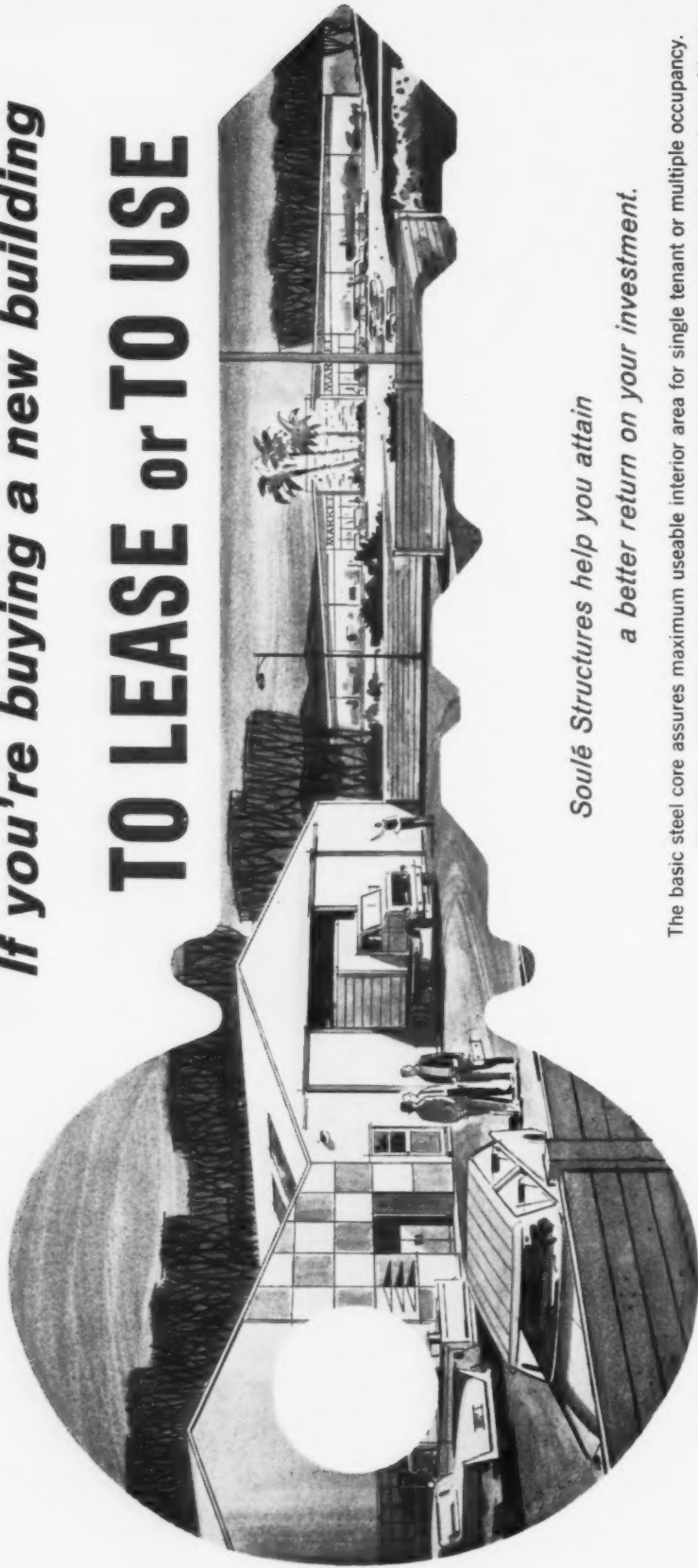
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